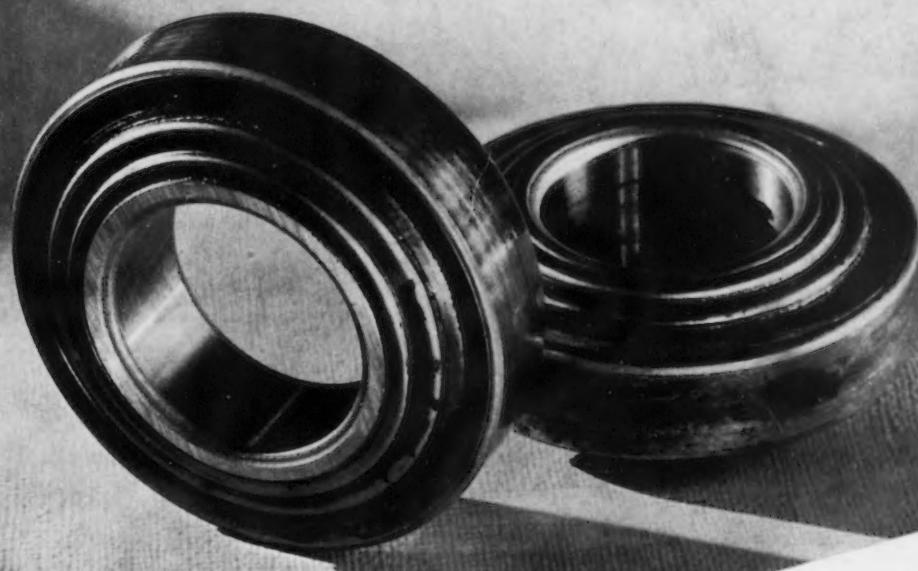


DECEMBER 23, 1937

THE IRON AGE

AGRICULTURE-ENGINEERING LIBRARY

LIBRARY
WEST VIRGINIA UNIVERSITY



24 hours a day for 6 years
— never re-lubricated

• These New Departure self-sealed, lubricated-for-life electric motor bearings have not cost one cent for maintenance. After the equivalent of 18 years ordinary operation, they are still serviceable. . . . Let New Departure help you to get lower cost machine maintenance. Send for Booklet D-4.

New Departure, Division General Motors Corporation, Bristol, Connecticut.

NEW DEPARTURE

With the Gulf Engineer "in the picture"

MODERN MACHINES

PERFORM

AD-ENG LUB.
Eng
Img
V. 140
No. 26
D. 23, 1937

Better



ACCURATE WORK and continuous, uninterrupted production—those are the two big objectives in busy industrial plants these days!

Highly specialized new machines turn out precision work with remarkable speed and accuracy—a tribute to the ingenuity of their designers, but a challenge to the lubrication engineer!

For here, in modern machines like these, lubrication must be exact. Close tolerances must be preserved. Highly finished gears and close fitting bearings must operate day in and day out without appreciable wear. Faulty work must be avoided.

Plant men have an able ally in this never-ending war on friction and inefficiency. Each day Gulf's large staff of trained lubrication engineers works with operating men in hundreds of plants from Maine to Texas. They recommend—from Gulf's complete line of 553 oils and greases—the lubricants best suited to each machine in the plant. Then they suggest improved methods of applying them.

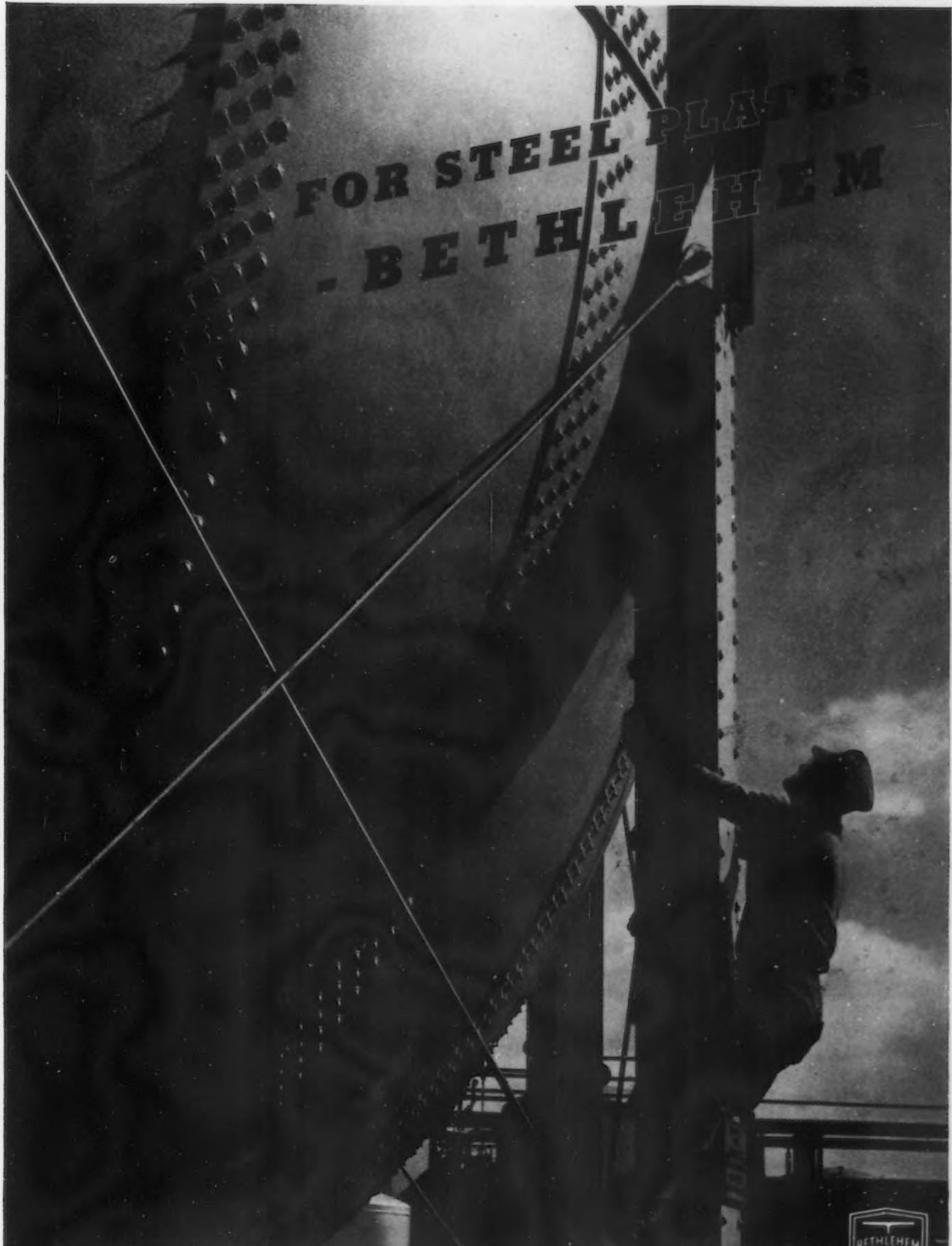
This careful attention to lubrication almost invariably brings economies in power and maintenance, with greater efficiency from each machine. A Gulf engineer is always at your service.

GULF OIL CORPORATION ★ GULF REFINING COMPANY

GENERAL OFFICES: GULF BUILDING, PITTSBURGH, PA.

2—THE IRON AGE, December 23, 1937

THE IRON AGE, published every Thursday by the CHILTON CO. (INC.). Publication Office, Chestnut & 56th Sts., Philadelphia, Pa. Editors and Executive Offices, 239 W. 39th St., New York, N. Y. Entered as second class matter November 8, 1932, at the Post Office at Philadelphia under Act of March 3, 1879. \$6.00 a year in U. S., Canada \$8.50, Foreign \$12.00. Vol. 140, No. 26.



BETHLEHEM STEEL COMPANY



ALANITE ROLLS

Our new roll for rolling spring and bumper stock, high carbon flats, and hexagons, small channels, angles, and shapes.

The AETNA-
STANDARD
ENGINEERING COMPANY
Youngstown, Ohio

CONSULTANTS · DESIGNERS and BUILDERS TO
THE STEEL AND NON-FERROUS INDUSTRIES



PLAIN CHILL ROLLS for
Sheets—Tin Plate
Strip—Rods
Plate
Skelp
Rails



MOLY CHILL ROLLS for
Sheets—Tin Plate
Strip—Rods
Plate
Skelp
Rails



ALANITE ROLLS for
Bumper Stock
Spring Stock
Angles—Channels
Shapes—Flats
Hexagons



ASEX GRAIN ROLLS for
Rods
Small Billets
Light Billets
Tire Sections
Edging Flats



SAND ROLLS for
Rails
Bars
Skelp



TUBE ROLLS for
Welding
Sizing
Reeling

**"ONE STEEL
CAN'T PRODUCE
THE RESULTS WE
GET WITH THIS
COMBINATION!"**

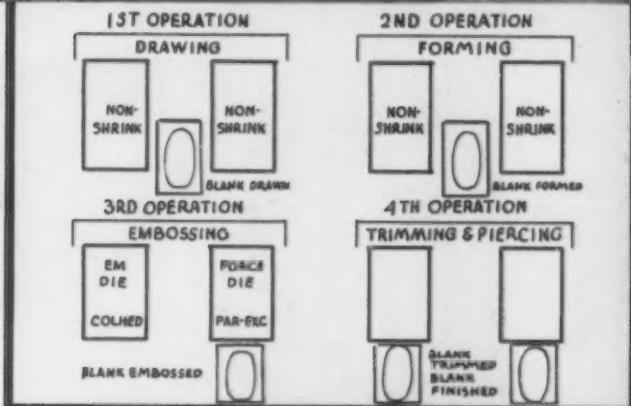


Diagram above illustrates die arrangement and the combination of Vasco Steels used. Dies are good for 100,000 escutcheons made of .025 Bronze.

The point of this story is that many times production can be increased by the use of the proper combination of die steels rather than to make all of the dies from one steel.

And Vasco Metallurgists are always able to help you to select the correct combination for every purpose.

**"BUT IT
TOOK PLENTY
TO SELL
HIM THIS
IDEA!"**



VANADIUM-ALLOYS

STEEL COMPANY
LATROBE, PA.

OXWELD^{*} SHAPE-CUTTING MACHINES

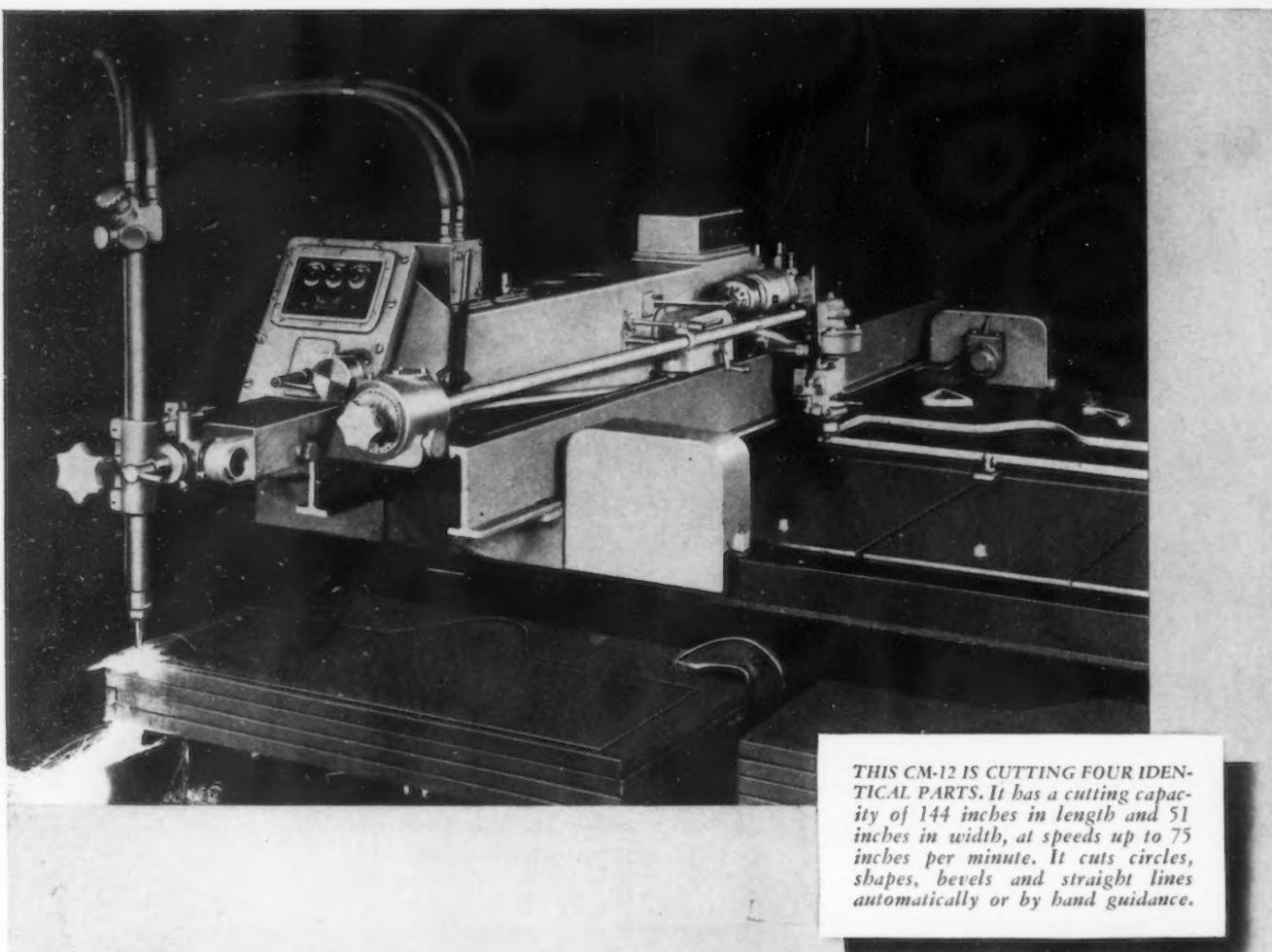
... for every cutting need..

MANUFACTURERS can save time and increase profits in shaping steel parts by using a stationary or portable Oxweld oxy-acetylene cutting machine. Every Oxweld shape-cutting machine permits practically unlimited freedom, within its scope, in fabricating steel products.

The stationary Oxweld CM-12 Machine, for example, combines accuracy with wide utility and ease of operation. It can be used economically for cutting the same shape repeatedly in large-scale production, as well as for making special items at low cost even where only one unit is required.

A Linde representative will gladly help you determine the economies that you can effect with flame cutting. The Linde Air Products Company, Unit of Union Carbide and Carbon Corporation, New York and principal cities.

*Trade-Mark



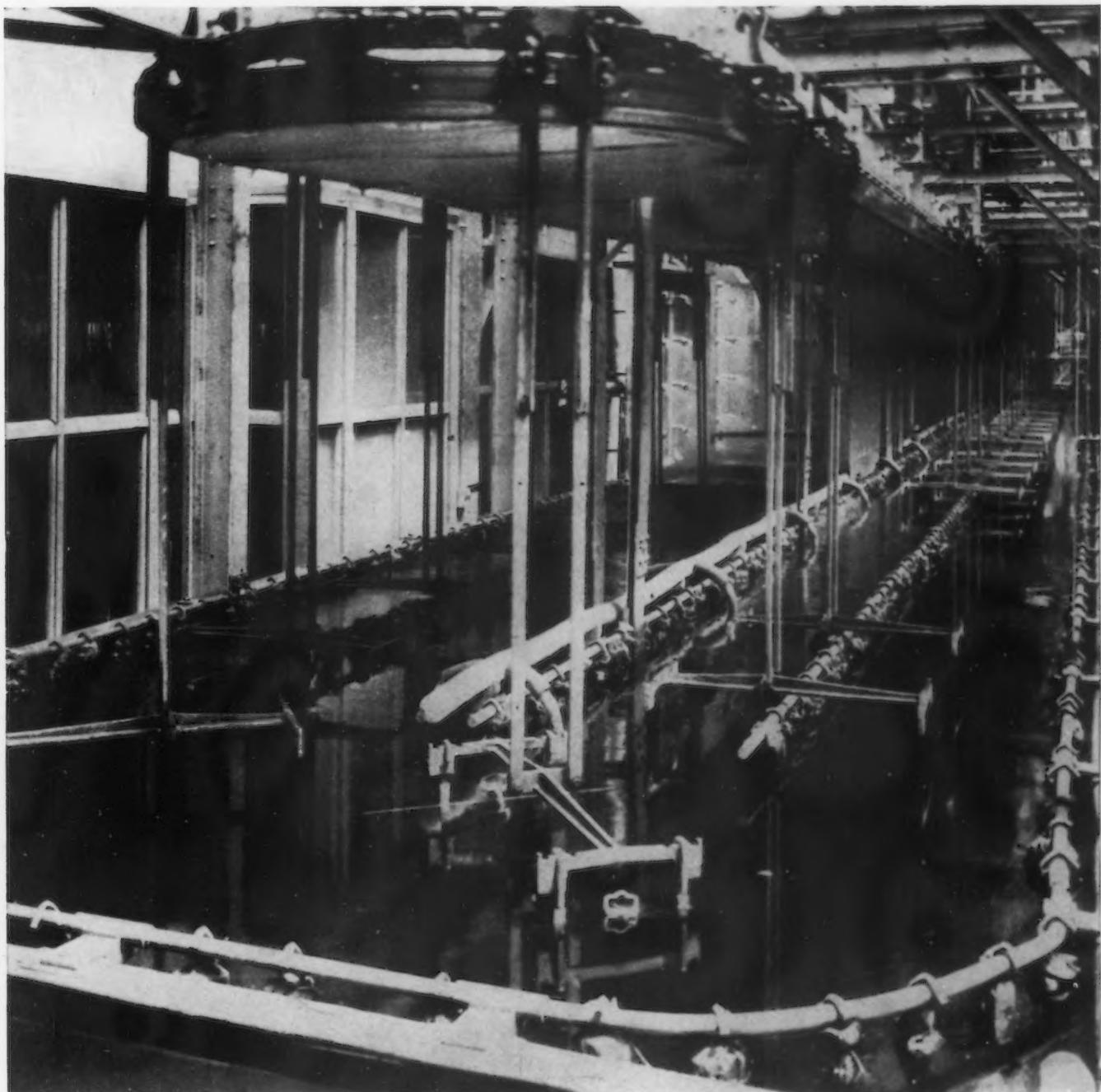
Everything for Oxy-Acetylene Welding and Cutting

LINDE OXYGEN • PREST-O-LITE ACETYLENE • OXWELD APPARATUS AND SUPPLIES

FROM



LINDE UNION CARBIDE



GOODRICH TANK USED SUCCESSFULLY FOR 3 YEARS IN BRIGHT NICKEL PLATING

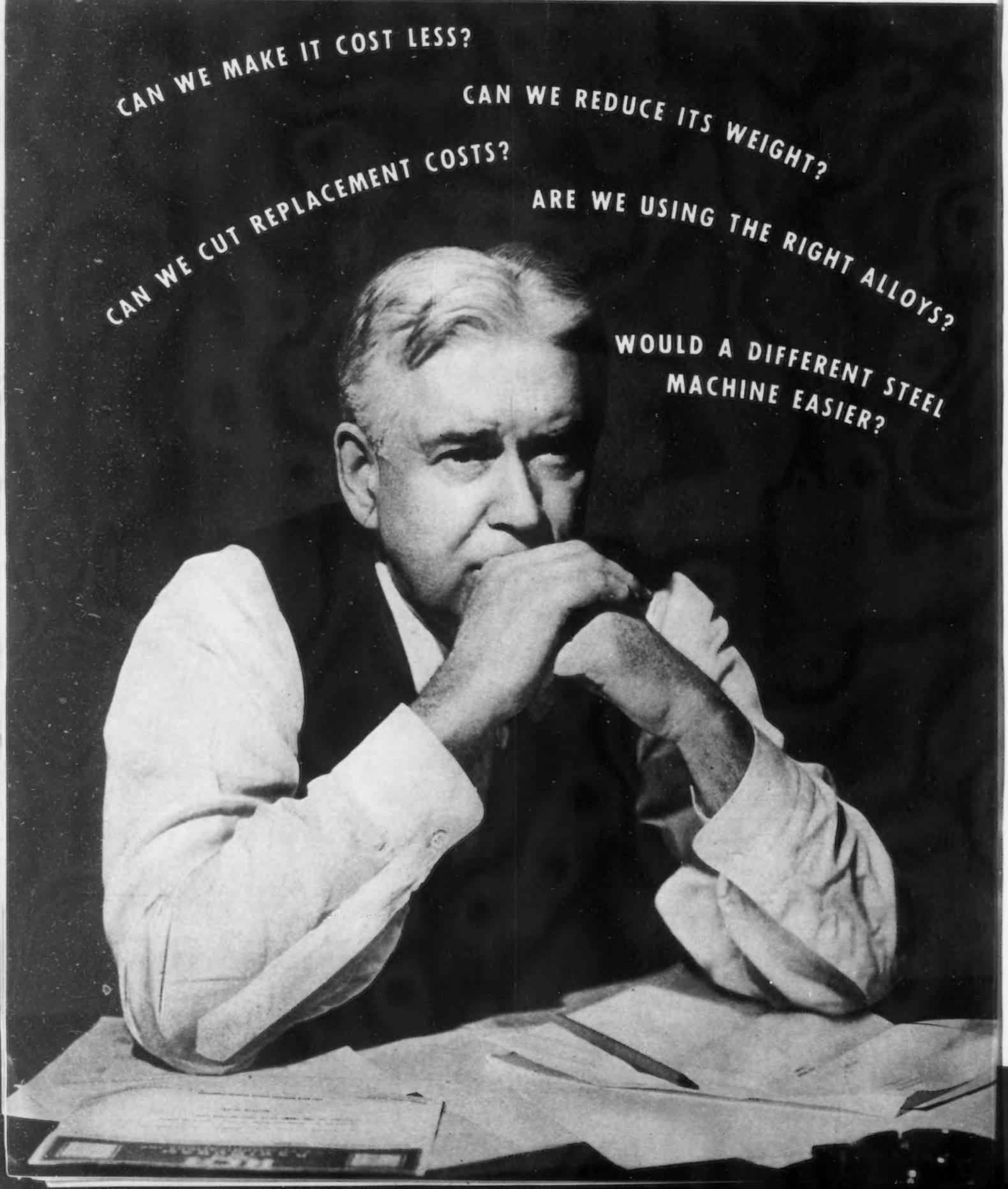
THREE years in constant service—a 70-ft. tank, operating at 140°-150° F., in the plant of a leading automobile manufacturer. In its 3 years' service, this Goodrich tank has never leaked, has never cost a penny for repairs and not once has the nickel plated-out on the Goodrich rubber surface. It has maintained a stiff production schedule without a single delay. The manufacturer says the tank has already paid for itself over and over again.

When you buy Goodrich tanks you get more than the exclusive Vulcalock adhesion, more than the patented Tri-flex expansion joint. You get the years of experience that only Goodrich can offer—experience gained in working with practically every kind of acid problem. Goodrich engineers developed the rubber-on-steel tank, and more Goodrich tanks are in use today than all other rubber-lined tanks combined. Goodrich experience and patented

Goodrich features can save you money and time, assure a safe, profitable, efficient installation. Write for the full facts to The B. F. Goodrich Company, Mechanical Rubber Goods Division, Akron, Ohio.

Goodrich
ALL products problems IN RUBBER

The Answer to a



CAN WE MAKE IT COST LESS?

CAN WE REDUCE ITS WEIGHT?

CAN WE CUT REPLACEMENT COSTS?

ARE WE USING THE RIGHT ALLOYS?

WOULD A DIFFERENT STEEL
MACHINE EASIER?

Designer's Prayer



STEELS which meet the exacting requirements of every part for which they are to be used.

STEELS which come true to specifications with striking uniformity order after order.

STEELS available in any needed form for most efficient working and fabrication.



WITHIN recent years the metallurgy of steels has become a vast and complex specialty—so vast and so complex that within United States Steel Corporation Subsidiaries alone there are 89 laboratories for testing and research, more than 1700 technicians.

To the machine or product designer this has probably been the greatest single factor in opening the way to improvement. Unfettered by the limitations of common steel he has been able to meet every need created by his designs, confident that his requirements could be met.

But if this widened range in steels has increased the opportunities for designers, it has brought with it a new problem—how to know just what specifications will serve his purpose best, what grades or types of steel will provide efficiency at lowest manufacturing cost. Must he turn metallurgist also?

Fortunately not. That is where U·S·S service comes in. We not only make every kind of steel, but within these subsidiaries is a corps of specialists in their use—metallurgists and sales engineers who are ready to follow through with you from drafting room to shop, who will not stop until the right solution is found for the job in hand. This service is yours for the asking. This is the full meaning of U·S·S in steel.

U·S·S HIGH TENSILE STEELS

To carry high unit stresses and reduce weight to a minimum.

U·S·S STAINLESS STEELS

To resist corrosive environments, to give high tensile strength with minimum weight, to insure permanence.

U·S·S HEAT-RESISTING STEEL

To endure temperatures disastrous to other metals.

U·S·S CARILLOY ALLOY STEELS

To strengthen vital parts such as springs, bearings, gears. Special analyses for every purpose.

U·S·S CONTROLLED STEELS

Carbon steels for forging, forming, heat treating and machining.

U·S·S ABRASION-RESISTING STEELS

To reduce abrasive wear, cut down replacements, reduce maintenance costs.

AND MANY OTHERS

in all wanted forms—sheets, plate, bars, tubing, wire, strip, etc. Write describing need.

AMERICAN STEEL & WIRE COMPANY, Cleveland, Chicago and New York
CARNEGIE-ILLINOIS STEEL CORPORATION, Pittsburgh and Chicago

COLUMBIA STEEL COMPANY, San Francisco

NATIONAL TUBE COMPANY, Pittsburgh

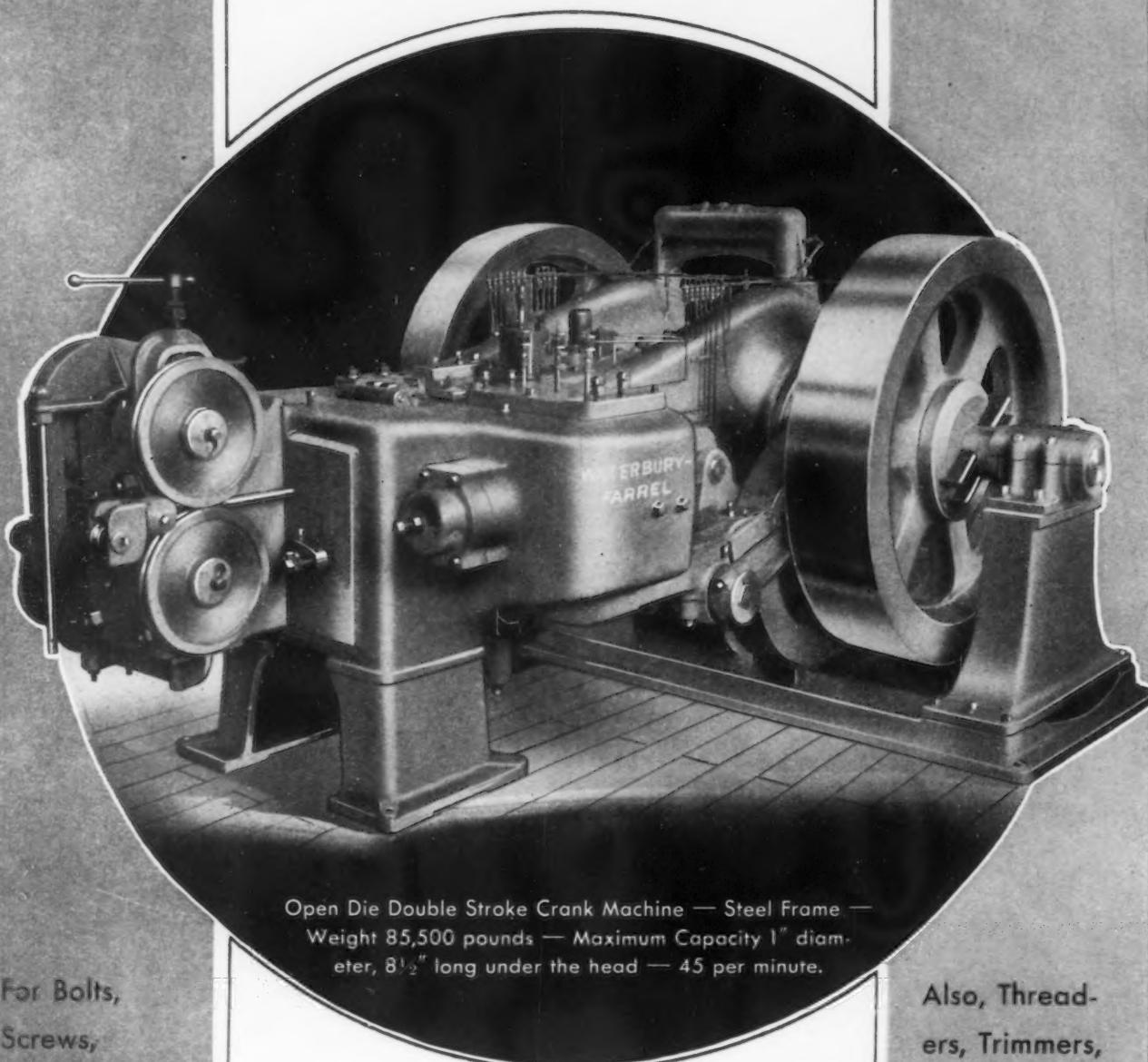
TENNESSEE COAL, IRON & RAILROAD COMPANY, Birmingham

United States Steel Products Company, New York, Export Distributors

UNITED STATES STEEL

WATERBURY-FARREL

Headers



Open Die Double Stroke Crank Machine — Steel Frame —
Weight 85,500 pounds — Maximum Capacity 1" diameter,
8½" long under the head — 45 per minute.

For Bolts,
Screws,
Rivets, Rods,
Spokes and
other head-
ed work
made by the
cold process.

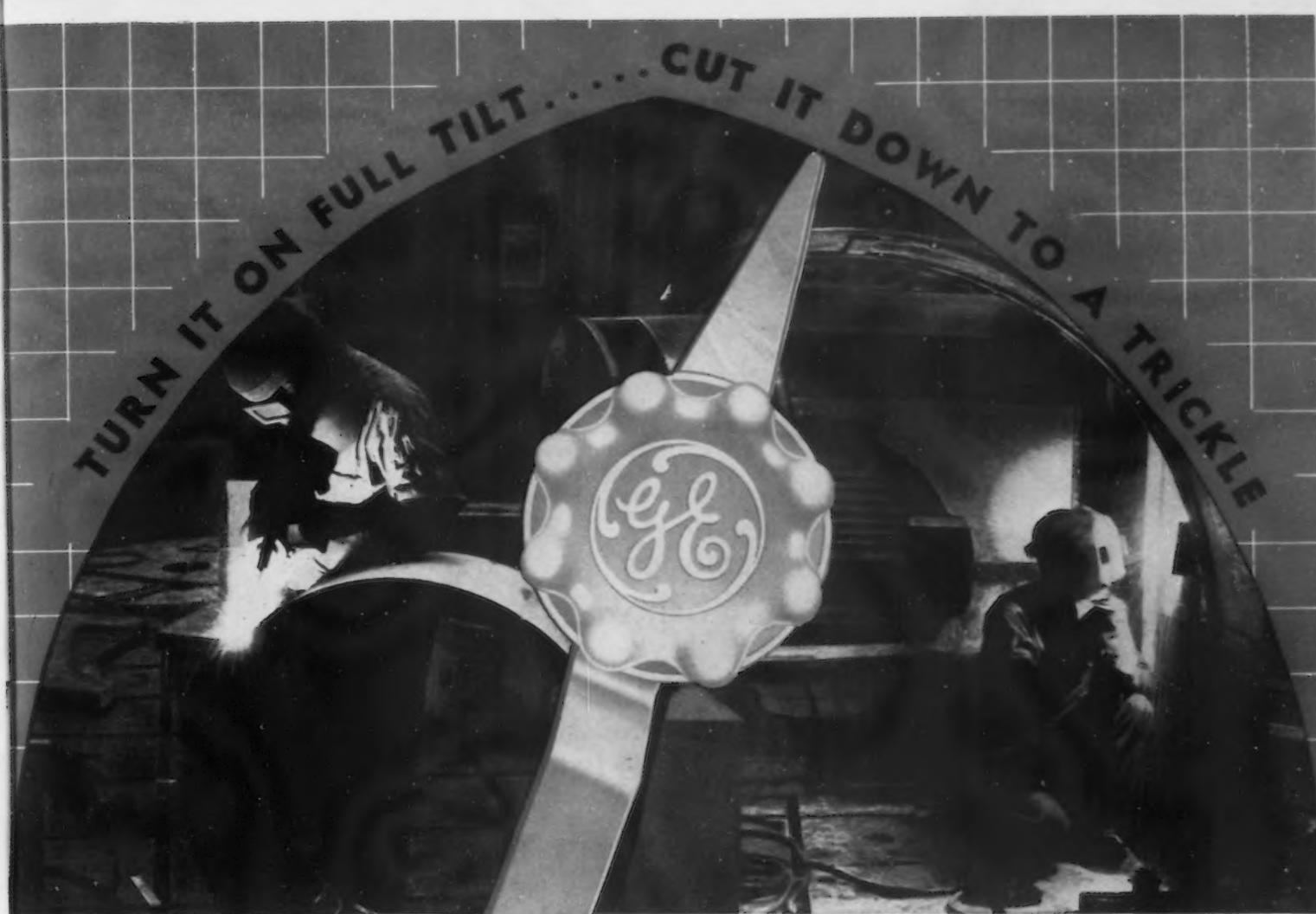
THE
WATERBURY FARREL
FOUNDRY AND MACHINE
COMPANY
WATERBURY, CONNECTICUT, USA.

CLEVELAND

CHICAGO

NEWARK, N. J.

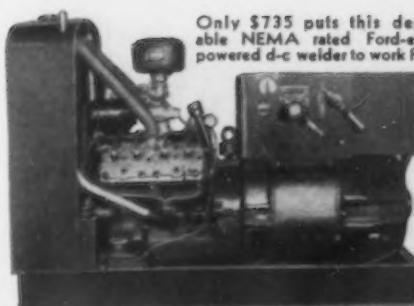
Also, Thread-
ers, Trimmers,
Slotters, Nut
Machines,
Rod, Wire,
Tube & Sheet
Metal Machin-
ery, Presses, etc.



Full-range, High-quality Performance, from Heaviest Plate to Light-gauge Welding

YOU can have both a wide welding range and high-quality output at every point in that range when you buy a G-E single-operator arc welder, with its new, improved features of design and performance. Step up the current to full capacity, cut it down to a mere trickle, or set it anywhere in between—exhaustive tests both in our factory and in the field prove that you'll get a "peppy," stable arc at all points in the entire range. The G-E set meets Navy specifications on every adjustment.

This exclusive feature is just one of many; you'll like them all. Ask the nearest G-E arc-welding distributor or G-E sales office today for full information. Or simply fill out the coupon and get the facts direct from welding headquarters.



General Electric, Dept. 6-201, Schenectady, N. Y.

Please send me a copy of:

- GEA-1440F, describing G-E single-operator motor- and engine-driven d-c welder
- GEA-2776, describing new Ford-engine-powered G-E arc welder

NAME _____

FIRM _____

STREET _____

CITY _____

STATE _____ 148-73

GENERAL ELECTRIC

Filing No. 8748

*"We are pleased
to report..."*

TO THE CUSTOMERS OF
WEIRTON STEEL COMPANY:

- As Time prepares a fresh page for the record, we are pleased to report a gratifying volume of business in the year about to close . . . business that reflects your support of our efforts to serve every Weirton customer well.
- By recently expanding our continuous strip department, for example, we not only increased our capacity, but also enabled Weirton to offer you the most highly finished hot and cold rolled sheet and strip possible under present day engineering methods.
- Similar improvements likewise have been made to continue Weirton's position as the world's largest independent tin plate producer. These recent additions include new type annealing, cold rolling and tinning equipment, together with necessary expansions in warehousing, handling and shipping facilities—all to the end that your satisfaction as a customer may be complete.
- In this accounting of increased business and improved operations, we are pleased also to report that Weirton now has a much wider diversification of products than is generally appreciated. The list covers structural material, plates, merchant bars, tie plates and spikes, pack rolled and cold reduced tin plate, roofing terne plate, tin mill black plate, galvanized, long terne and black sheets, hot and cold rolled strip and sheets—in all of which lines we produce a range of sizes and grades to cover a vast field in the consuming trade.
- Wherever you look, there's a place for Weirton Steel. May we be permitted, this coming year, to suggest additional ways in which Weirton Steel can serve *you*?

WEIRTON STEEL COMPANY
WEIRTON, WEST VIRGINIA

DISTRICT SALES OFFICES: *Boston, 1001 Statler Office Bldg.; Chicago, 228 North LaSalle Street; Cincinnati, 2606 Carew Tower; Cleveland, 1217 Leader Bldg.; Detroit, 11-210 General Motors Bldg.; New York, 500 Fifth Avenue; Philadelphia, 1462 Broad St. Station Bldg.; Pittsburgh, 2800 Grant Bldg.; Rochester, 45 Exchange Street; San Francisco, Sharon Building; Toronto, General Assurance Building, 357 Bay Street*



UNIT OF NATIONAL STEEL CORPORATION

Yoloy High Tensile Steel Frames Are Preferred Where Stresses Are Greatest

Dump trailers are peculiarly different from ordinary trailers. During the dumping period the entire force of the load is concentrated in the center of the trailer frame, with the result that momentary stresses 5 to 10 times greater than normal load-carrying stresses are set up. Previous chassis construction was carbon steel frames plus reinforcement of carbon steel bars with sundry flange and web additions producing increased dead weight, higher platform height and occasional frame failures.



YOLOY High Tensile Steel frame fabricated by The Youngstown Steel Car Corp., Niles, Ohio

Not only did Yoloy solve these problems successfully, without a single frame failure reported to date, but the original frame dimensions have been retained and no costly alterations in dies, jigs or fixtures were necessary to make the change-over.

Yoloy is writing a success story in fabrication--a story based on increased strength plus weight reduction. In your product the same savings probably can be made. Youngstown has experienced technicians who would be glad to investigate those savings for you.

THE YOUNGSTOWN SHEET AND TUBE COMPANY

Manufacturers of Carbon and Alloy Steels
General Offices - - YOUNGSTOWN, OHIO



High Tensile Steel Yoloy is available in sheets, strips, plates, bars, shapes, manufacturer's wire, welding wire, seamless pipe and electric weld pipe.

3-4A

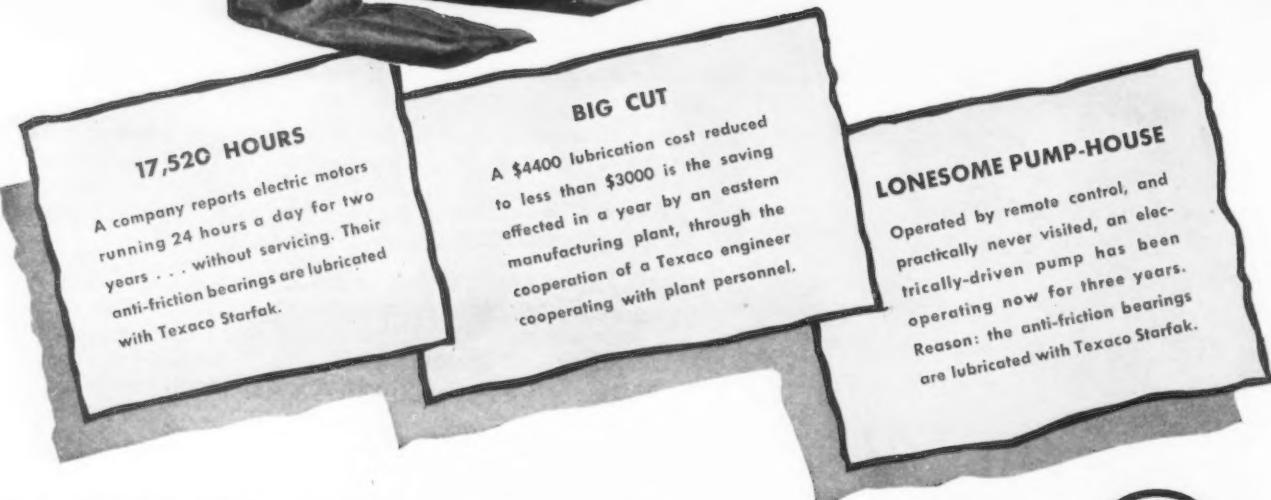
YOUNGSTOWN

ENGINEERING SERVICE

that gets results



"BEST EVER"
Inspecting steam turbine bearings, running on Texaco Regal for years, the builder's representative pronounced them to be in the best condition of any he had ever seen.



17,520 HOURS
A company reports electric motors running 24 hours a day for two years . . . without servicing. Their anti-friction bearings are lubricated with Texaco Starfak.

BIG CUT
A \$4400 lubrication cost reduced to less than \$3000 is the saving effected in a year by an eastern manufacturing plant, through the cooperation of a Texaco engineer cooperating with plant personnel.

LONESOME PUMP-HOUSE
Operated by remote control, and practically never visited, an electrically-driven pump has been operating now for three years. Reason: the anti-friction bearings are lubricated with Texaco Starfak.

TEXACO

INDUSTRIAL LUBRICANTS



Speed! Speed! Speed!

cries industry



*Today's severe demands on equipment
call for utmost wire rope stamina*

Industry must reduce costs—to make profits. More work from existing equipment—and faster.

Roebling "Blue Center" Steel Wire Rope has more than met these exceptionally severe requirements.

Roebling "Blue Center" combines the highest strength with the maximum resistance against fatigue and wear. For a wide variety of applications where service conditions are exceptionally severe, *it has proved conclusively that it assures lowest general average operating costs.*

JOHN A. ROEBLING'S SONS CO., TRENTON, N. J. Branches in Principal Cities

*The Highest
Development in
Roebling Wire Rope*

1 STRONGER
Wire of highest strength
and toughness

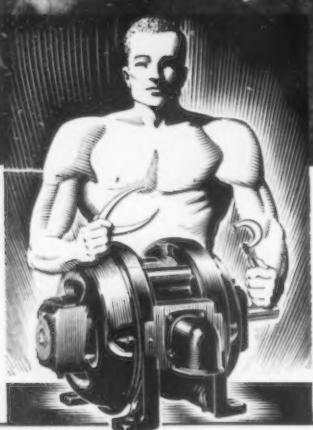
2 TOUGHER
Provides maximum resistance
against wear, sudden
shocks, vibration

3 SAFER
Unequalled for uniformity
of quality

4 SAVING
Ensures lowest general
average operating cost

ROEBLING ★ BLUE CENTER

"Built from the Inside Out"



**G-E MOTORS
PASS ALL TESTS**

INSULATION "built from the inside out"—like that on the G-E form-wound coil which this motor user is inspecting layer by layer—assures reliable motor performance in your plant. Every coil that goes into a G-E motor—whether random-wound for the smaller sizes or form-wound for medium-sized and large motors—is built to provide long life in your service.

Hundreds of laboratory tests were made in developing the high-bonding-strength varnish, the high-dielectric insulating materials for the slot portion, and the proper methods of application and curing to assure a high-quality insulation assembly. Rigid factory tests assure the proper manufacture of all materials. And, finally, continuous inspections make sure that every coil is made exactly right. At every important step in the manufacture of G-E motors, similarly exacting tests are made, not only to make sure that General Electric quality is maintained but also to find new ways to raise this quality *still higher*.

GENERAL ELECTRIC



020-352

—How G-E Motor Insulation Helps Keep Your Production Moving

SUPPOSE you were to go into a G-E motor factory and select any standard form-wound motor coil from the production line. Then—like the man on the opposite page—suppose you were to strip back the outer layers of tape and varnished-cambric wrappings to see what is underneath.

You would find that even the innermost cotton covering over the conductors is completely impregnated with G-E insulating varnish. Every pore of the fabric is filled, every thread solidly bonded—evidence of the “built from the inside out” kind of insulation that is a big factor in assuring continuous, trouble-free operation of G-E motors.

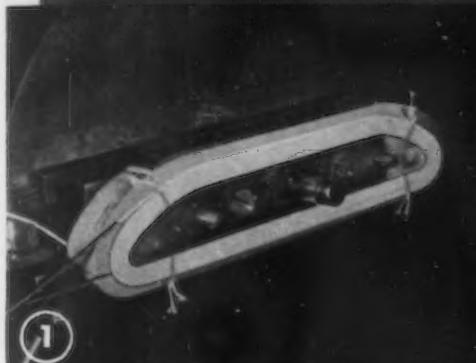
Here's why you can count on longer life from the coils used in G-E motors: They do not depend on a final surface coating of varnish for electrical and mechanical insulation. Such a practice results in only partial impregnation of the inner coverings—imperfect insulation that permits the absorption of moisture and attacks by foreign substances that break down the dielectric strength of the insulation. The effect of such coils in motors is reduced insulation life, production delays, and unnecessary repair expense.

In G-E motor factories, proved manufacturing procedures and continual testing of products prevent such a result. Every form-wound coil is varnish-impregnated and baked at every step in its manufacture. The pictures at the right show how a typical coil is made, to assure longer life. It is this same attention to detail, throughout their manufacture, that makes G-E motors able to Pass All Tests in your service.



4
baked in this oven. A final taping, impregnation, and bake complete the process.

IN MANUFACTURING G-E FORM-WOUND COILS



1

the cotton-covered conductors are wound on this bobbin. After initial varnish treatment.



2

the slot portion is pressed, or “baked,” to assure rigidity. The coils are then formed.

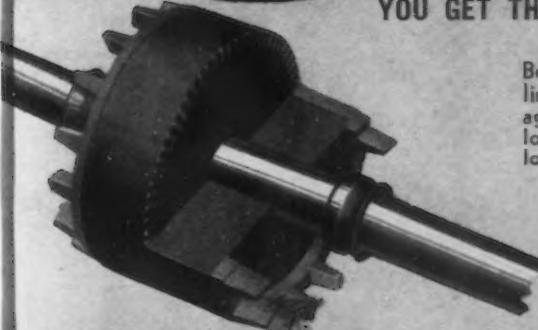


3

wrapped with slot insulation, tinned, dried, and baked. After each dipping, the coils are

YOU GET THESE EXTRA-VALUE FEATURES IN G-E SKELETON-FRAME INDUCTION MOTORS

Below—Steel-shell, babbitt-lined sleeve bearings, sealed against dust and dirt, assure long life of bearings and low maintenance costs

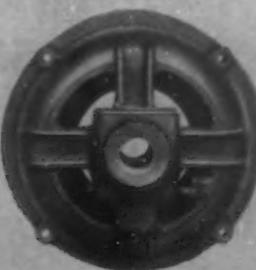


Squirrel-cage rotor, with indestructible cast-aluminum windings, has integrally cast fans at both ends. There are no joints to cause high-resistance spots



This cast-iron skeleton frame is unusually strong and rigid. The high-quality insulation of these form-wound coils means long motor life and low upkeep costs

Below—Strong, cast-iron end shields protect the end windings, permit the entrance of ample cooling air, and assure rigid support for the bearings



WESTINGHOUSE "Type Y" AIR COMPRESSORS

*Give Warning
of LOW OIL LEVEL*

The pressure lubricating system of the type Y Air Compressor is so interlocked with its unloader that if the oil supply drops to a dangerously low level the compressor will begin to idle at no load—thus giving immediate warning that replenishment is necessary. This protection against lack of lubrication is a unique feature of Westinghouse Compressors.

Our Descriptive Catalogue 2051 outlines many other likewise noteworthy advantages.

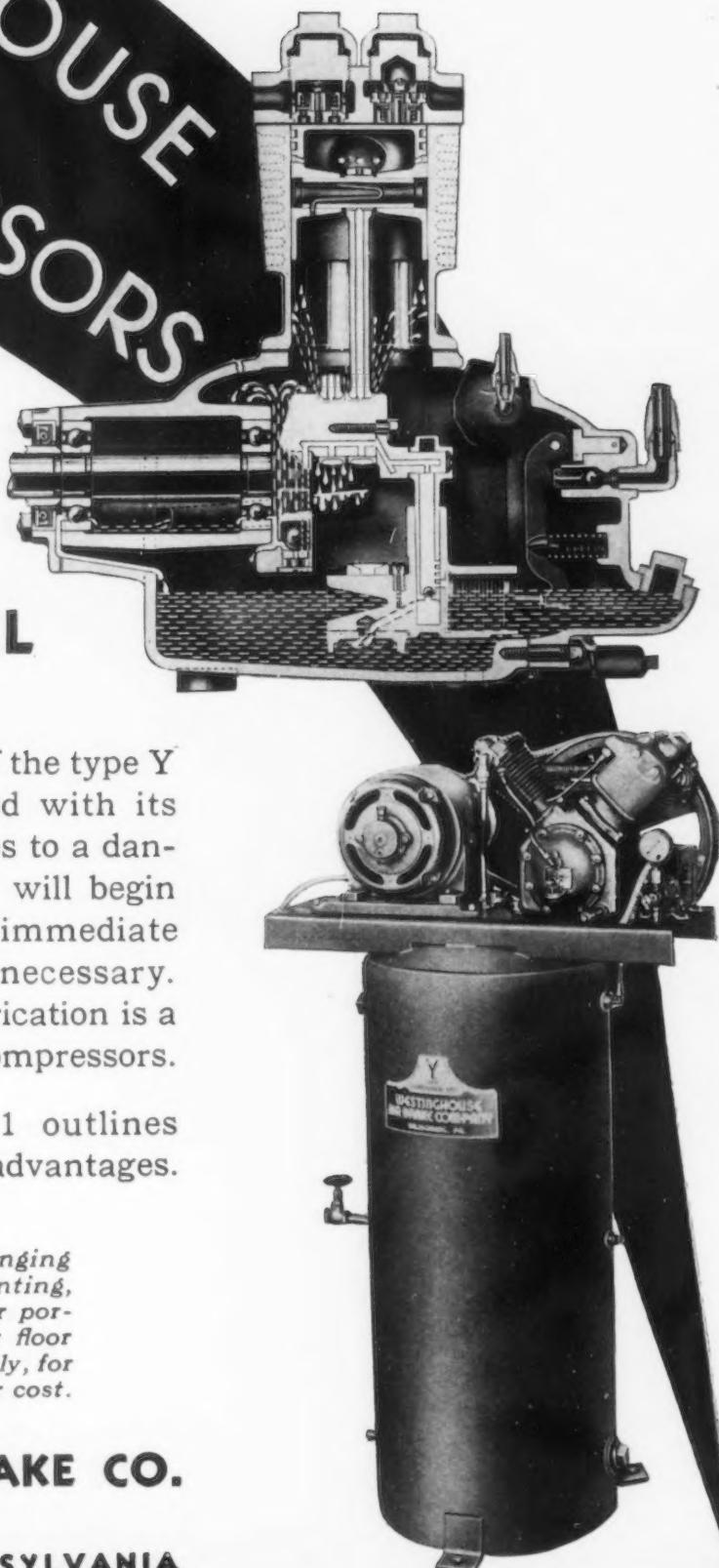
This compressor is made in sizes ranging from 4 to 45 cu. ft. . . . Tank mounting, vertical and horizontal, for fixed or portable use; bed plate mounting for floor installation; or compressor unit only, for direct drive . . . Noted for low power cost.

WESTINGHOUSE AIR BRAKE CO.

Industrial Division

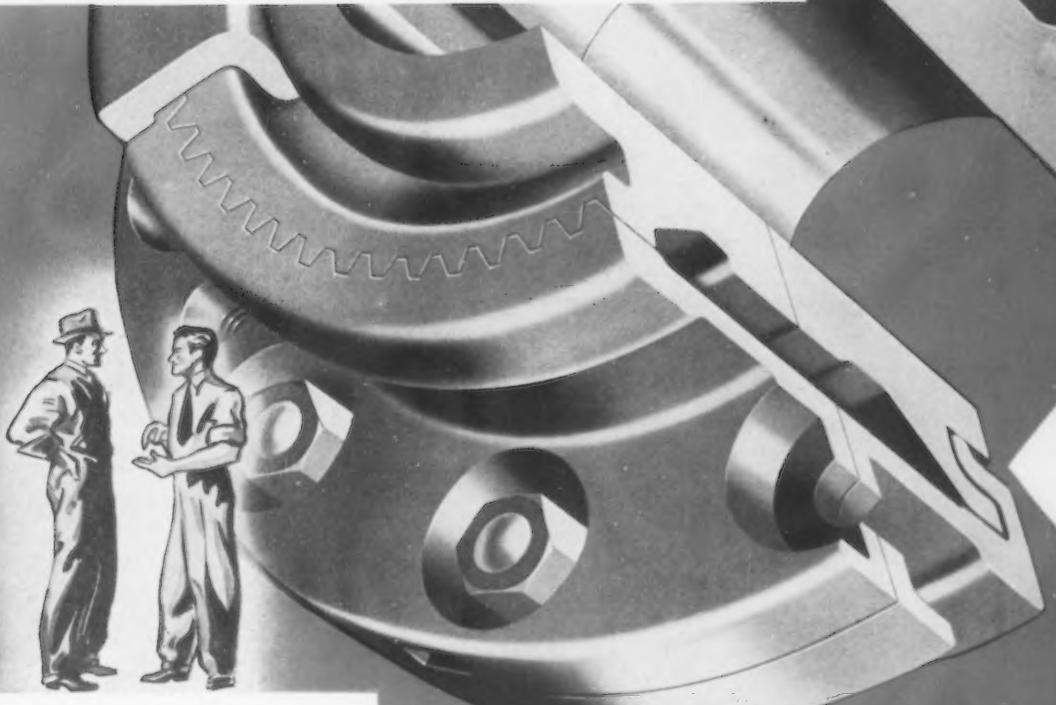
PITTSBURGH • PENNSYLVANIA

18—THE IRON AGE, December 23, 1937



"I want to be SURE!"

"Give me the genuine
FAST'S ^{SELF-ALIGNING} **COUPLING"**



"Fast's couplings are my choice every time. That one on the bar mill main drive, put in 16 years ago, never cost a cent in upkeep or caused one minute's delay, and is as good today as the day it was installed!" (Data from a service report).

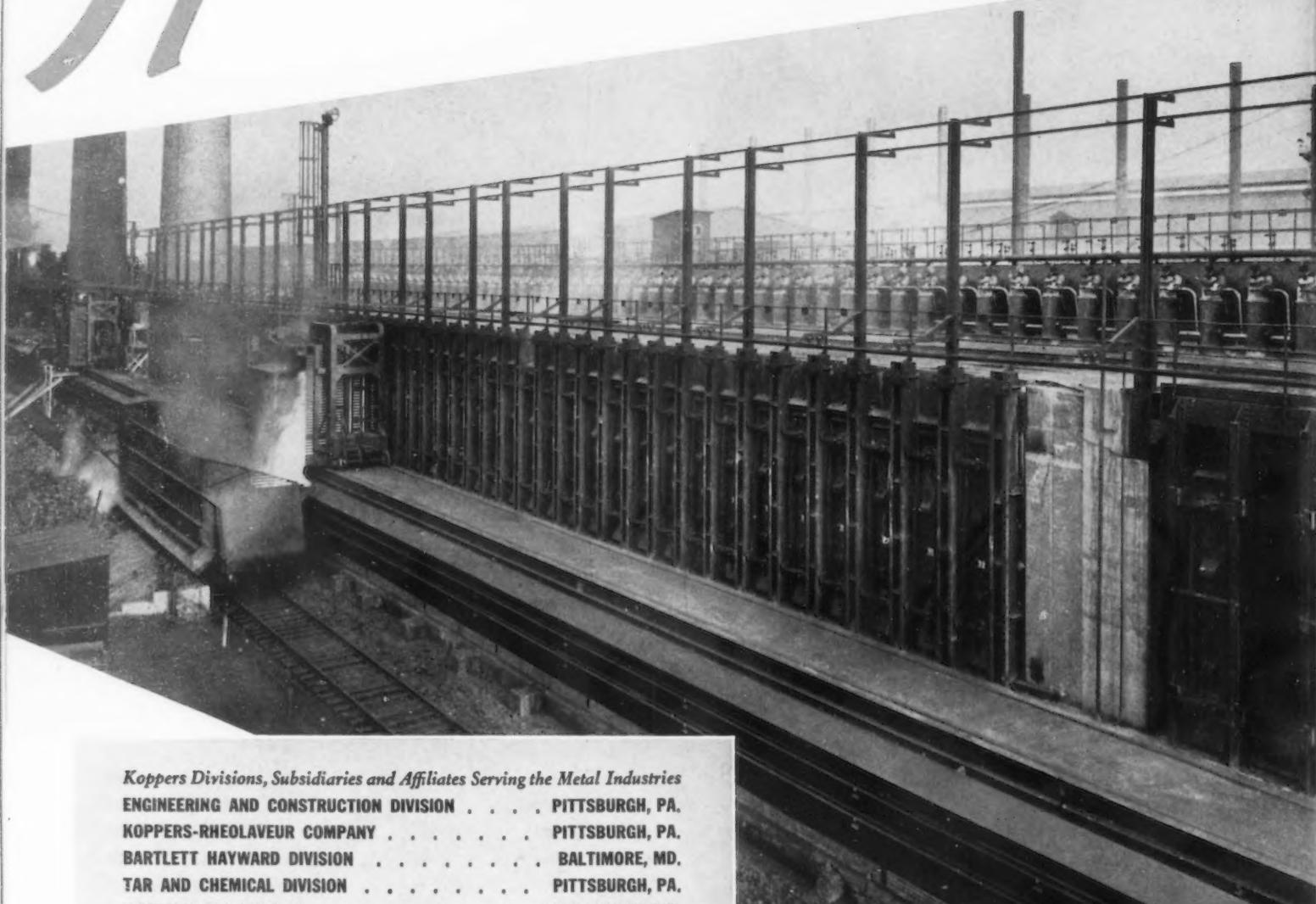
THE BIGGEST THING in the mind of the operating man is continuous operation. Fast's Self-Aligning Couplings have for 17 years proven themselves valuable in eliminating shut downs, and keeping production going.

KOPPERS COMPANY • BARTLETT HAYWARD DIVISION • BALTIMORE, MARYLAND

KOPPERS

DESIGNERS • BUILDERS • PRODUCERS • MANUFACTURERS • DISTRIBUTORS • OPERATORS

59 MORE KOPPERS-BECKER COKE OVENS GO INTO OPERATION



Koppers Divisions, Subsidiaries and Affiliates Serving the Metal Industries

| | |
|---|----------------------|
| ENGINEERING AND CONSTRUCTION DIVISION | PITTSBURGH, PA. |
| KOPPERS-RHEOLAVEUR COMPANY | PITTSBURGH, PA. |
| BARTLETT HAYWARD DIVISION | BALTIMORE, MD. |
| TAR AND CHEMICAL DIVISION | PITTSBURGH, PA. |
| WESTERN GAS DIVISION | FORT WAYNE, IND. |
| AMERICAN HAMMERED PISTON RING DIVISION | BALTIMORE, MD. |
| GAS AND COKE DIVISION | PITTSBURGH, PA. |
| THE KOPPERS COAL COMPANY | PITTSBURGH, PA. |
| NEW ENGLAND COAL & COKE COMPANY | BOSTON, MASS. |
| THE WOOD PRESERVING CORPORATION | PITTSBURGH, PA. |
| NATIONAL LUMBER & CREOSCTING COMPANY | TEXARKANA, ARK.-TEX. |
| THE WHITE TAR COMPANY OF NEW JERSEY, INC. | KEARNY, N. J. |
| THE MARYLAND DRYDOCK COMPANY | BALTIMORE, MD. |

Koppers Products Serving the Metal Industries

Coke Oven Plants . . . Conveying Systems . . . Liquid Purification Plants . . . Oxide Purification . . . Phenol Removal Plants . . . Benzol Recovery Plants . . . Ore Concentration Plants . . . Sulfur Recovery . . . Water Gas Plants . . . Tar Displacement Systems . . . Tar Extractors . . . Fast's Self-aligning Couplings . . . D-H-S High Tensile Bronze Castings . . . Iron Castings . . . Coal . . . Coal Tipples . . . Coal Washing Plants . . . Coal Drying Plants . . . Coal de-dusting and Dust Collecting Equipment . . . Coal Crushing Plants . . . Coke . . . Steam Accumulators . . . Barges . . . Ships . . . Blast Gates . . . Gas Holders . . . Charging, Clinker and Clean-out Doors . . . Gas, Air and Water Valves . . . Drydocking Facilities . . . Cylinder Packing . . . American Hammered Piston Rings . . . Waterproofing and Damproofing Materials . . . Roofing Materials . . . Tarmac for plant paving . . . Bituminous-base Paints . . . Lumino Paint . . . Rolling Mill Bronze . . . Treated Timber . . . Disinfectants . . . Insecticides . . . Deodorants . . . Fire Hydrants

This photograph shows the new battery of 59 Koppers-Becker Low Differential Ovens at the Inland Steel Company, Indiana Harbor, Ind., just after the first charge of coke had been pushed in mid-November.

They bring the number of Koppers-Becker Ovens at that plant to 207 (in addition to 66 Koppers Ovens) and the coal-carbonizing capacity to more than 2,000,000 tons a year.

KOPPERS COMPANY
Engineering and Construction Division
PITTSBURGH

KOPPERS

DESIGNERS - BUILDERS - PRODUCERS - MANUFACTURERS - DISTRIBUTORS - OPERATORS

When You Change the Product Let INLAND Change the Steel



Change the design of your product and often it becomes necessary to change the kind of steel you are using.

Whenever this problem arises Inland field men can be of real service to your plant.

FOR EXAMPLE:

Recently a large equipment manufacturer, seeking to improve his product, adopted a heat-treated part. This part required a minimum hardness (Rockwell C-43) after quenching and drawing.

Samples had been satisfactory, but mass production brought a great deal of loss from cracking in the quench. A steel of different analysis was ordered,

but after the quench it lacked sufficient hardness.

A SUGGESTION

This manufacturer then followed the suggestion which is now being passed on to you. He called his nearest Inland office for some special help on the problem. Within a few days Inland metallurgists had the proper analysis steel moving swiftly and economically through his plant.

IT'S PRACTICAL

Inland is especially equipped and organized to perform this kind of service for steel users. Others are finding it highly valuable—so will you.

SHEETS STRIP TIN PLATE BARS RAILS TRACK ACCESSORIES PLATES FLOOR PLATES
STRUCTURALS PILING REINFORCING BARS

INLAND STEEL CO.

General Offices: 38 South Dearborn Street, Chicago, Illinois • Offices in: Detroit-Kansas City-Milwaukee-St. Louis-St. Paul

"Barnes-made" SPRING APPLICATIONS

Automotive Equipment

Air Brakes
Anti Rattlers
Auto Bodies
Brakes
Brake Bands
Brake Rods
Brake Shoes
Carburetors
Clutch
Curtains
Generators
Grease Cups
Head Lights
Hood Hooks
Horns
Ignitions
Mufflers
Odometers
Oil Cups
Shock Absorbers
Speedometers
Stabilators
Starters
Stop Lights
Tail Lights
Timers
Tire Connections
Transmissions
Valves
Windows



Aviation

Aeronautical Equipment
Antennae Reels
Brakes
Carburetors
Clutch
Fuel Pumps
Ignitions
Oleo Strut Shock Absorbers
Parachutes
Push Rods
Starting Equipment
Super Chargers
Tail Skids
Valves
Variable Speed Propellers



Diesel Equipment

as developed
and in
process of
development



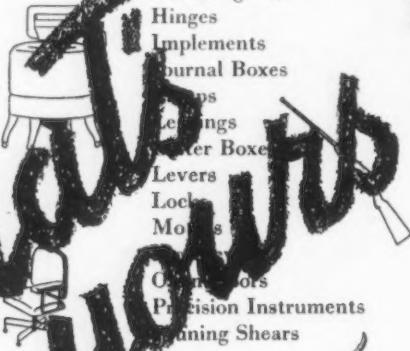
Electrical Appliances

Brushes
Cords
Curling Irons
Curling Iron Holders
Electric Light Sockets
Electric Light Switches
Electric Light Switch Washers
Heaters
Irons
Motors
Pneumatic Tools
Pneumatic Tool Clips
Telephones
Toasters
Vacuum Cleaners
Vibrators
Washing Machines



Furniture

Cabinet Furniture
Chairs
Desks
Display Cabinets
Drawers
Footstools
Linen Closets
Tables
Upholstered Chairs



Machinery, Miscellaneous

Bread Machinery
Can Opening Machines
Drills
Drill Presses
Floor Surfacing Machines
Knitting Machinery
Moving Picture Machines
Shoe Machinery

Miscellaneous

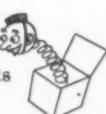
Berths
Bicycles
Bicycle Bells
Bicycle Brakes
Bicycle Pants Guards
Bracelets
Cameras
Cars
Car Windows
Cigarette Cases
Clocks
Door Checks
Elevators



Exercisers
Fare Registers
Fire Extinguishers (Small Parts)
Fire Extinguishers
Gas Cocks
Gas Engines
Gas Heater Washers
Gas Meters
Gong Bells
Governors
Guns
Hair Curlers
Headbands
Heat Regulators
Hinges
Implements
Journal Boxes
Levers
Locks
Motors
Oscillators
Precision Instruments
Planing Shears
Pumps
Pump Valves
Punches
Sashes
Scales
Sewing Machines
Shade Rollers
Shears
Spray Guns
Steam Pumps
Stethoscopes
Surgical Instruments
Suspenders
Taximeters
Ticket Punches
Toys
Trolleys



Trolley Catchers
Trusses
Truss Attachments
Vibrators
Window
Window Screens
Window Screen Lifts
Window Shades
Wrenches
Wrench Washers



Musical Instruments

Automatic Pianos
Bellows
Corns
Horns
Organs
Phonographs
Pianos
Player Pianos
Saxophones
Traps



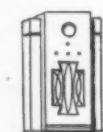
Office Appliances

Addressing Machines
Auto Calls
Cabinets and Files
Cash Registers
Check Protectors
Comptometers
Dictaphones
Drawing Instruments
Envelope Sealers
Loose Leaf Books
Mailing Machines
Numbering Machines
Stamp Affixers
Staplers
Time Clocks
Time Locks
Time Recorders
Typewriters



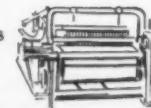
Radio

Battery Clip Parts
Binding Posts
Jacks
Plugs
Springs
Spring Washers
Stampings



Textile Machinery

Bobbin Rings
Card Repeaters
Dobbies
Head Motions
Looms
Lubrication
Picker Sticks
Reversing Mechanisms
Shuttles



THE WALLACE BARNES CO., Bristol, Connecticut

DIVISION OF ASSOCIATED SPRING CORPORATION

SPRINGMAKERS FOR MORE THAN THREE QUARTERS OF A CENTURY

COMPLETE HEAT TREATING EQUIPMENT OIL, GAS, ELECTRIC • ALL STANDARD FINISHES

SPECIAL DEPARTMENT FOR SMALL ORDERS • EXPERIMENTAL DESIGN CO-OPERATION

FRITZ J. FRANK
President
J. H. VAN DEVENTER
Editor
C. E. WRIGHT J. A. ROWAN A. I. FINDLEY
Managing Editor *News Editor* *Editor Emeritus*
R. E. MILLER F. J. WINTERS T. W. LIPPERT
Machinery Editor *Art Editor* *Metallurgical Editor*
Associate Editors
F. J. OLIVER G. RICCIARDI
F. JURASCHEK
Consulting Editor
Washington Editor
L. W. MOFFETT
Resident District Editors
T. C. CAMPBELL ROBERT G. BINGHAM
Pittsburgh *Chicago*
F. L. PRENTISS W. F. SHERMAN
Cleveland *Detroit*
Editorial Correspondents
F. B. RICE-OXLEY ROBERT G. MCINTOSH
London, England *Cincinnati*
G. FRAZAR P. FIDRMUC
Boston *Hamburg, Germany*
L. E. MEYER CHARLES POST
Milwaukee *San Francisco*
F. SANDERSON ASA ROUNTREE, JR.
Toronto, Ontario *Birmingham*
LEROY W. ALLISON ROY M. EDMONDS
Newark, N. J. *St. Louis*
F. T. TURNER
Buffalo

★

Owned and Published by



CHILTON COMPANY
(Incorporated)

Publication Office Editorial and
Chestnut and 56th Sts., Executive Offices
Philadelphia, Pa. 239 West 39th St.
New York, N. Y.

OFFICERS AND DIRECTORS

C. A. MUSSELMAN, *President*
FRITZ J. FRANK, *Executive Vice-President*
FREDERIC C. STEVENS, *Vice-President*
JOSEPH S. HILDRETH, "
GEORGE H. GRIFFITHS, "
EVERIT B. TERHUNE, "
WILLIAM A. BARBER, *Treasurer*
JOHN BLAIR MOFFETT, *Secretary*
JOHN H. VAN DEVENTER
JULIAN CHASE
THOMAS L. KANE
CHARLES S. BAUR
G. CARROLL BUZBY
P. M. FAHRENDORF

★

C. S. BAUR, *General Advertising Manager*
A. H. DIX, *Manager Reader Service*

Member, Audit Bureau of Circulations
Member, Associated Business Papers
Indexed in the Industrial Arts Index.
Published every Thursday. Subscription Price: United States and Possessions, Mexico, Cuba, \$6.00, Canada, \$8.50 Foreign, \$12.00 a year.
Single copy, 25 cents. Cable Address, "Ironage, N. Y."

ADVERTISING STAFF
Emerson Findley, 621 Union Bldg., Cleveland
B. L. Herman, Chilton Bldg., Chestnut & 56th
Sts., Philadelphia, Pa.
H. K. Hottenstein, 802 Otis Bldg., Chicago
H. E. Leonard, 239 W. 39th St., New York
Pearce Lewis, 7310 Woodward Ave., Detroit
C. H. Ober, 239 W. 39th St., New York
W. B. Robinson, 428 Park Bldg., Pittsburgh
D. C. Warren, P. O. Box 81, Hartford, Conn.

THE IRON AGE

Contents

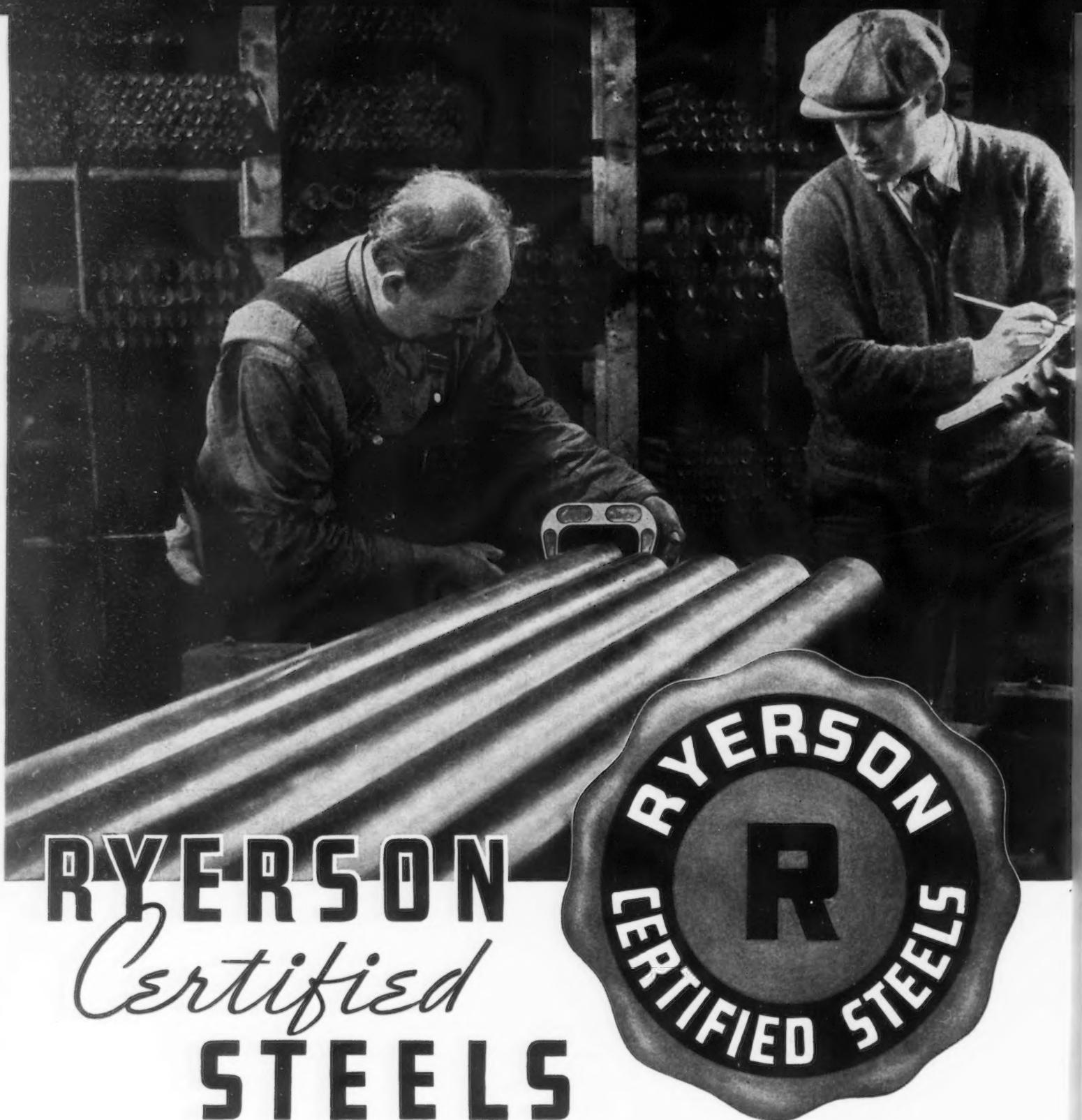
DECEMBER 23, 1937

| | |
|--|-----|
| Fable of the Kind Hearted Sea Captain..... | 25 |
| Welded Passenger Cars..... | 26 |
| World's Largest Industrial Truck Battery..... | 31 |
| Electric Heat Hardening of Bolts..... | 32 |
| Lubrication of Pinions and Roll Neck Bearings..... | 34 |
| Fast Melting With Gas Immersion..... | 40 |
| Engineering for Production in Stainless Steel..... | 43 |
| New Equipment..... | 46 |
| Statistics on Metal-Working Activity..... | 48 |
| Rate of Activity in Capital Goods..... | 49 |
| Automotive Industry..... | 50 |
| Washington News..... | 54 |
| NEWS CONTENTS..... | 66 |
| Plant Expansion and Equipment Buying..... | 104 |

▼ ▼ ▼

| | |
|---------------------------|-----|
| Just Between Us Two..... | 110 |
| Products Advertised..... | 109 |
| Index to Advertisers..... | 134 |

Copyright 1937 by Chilton Company (Inc.)



RYERSON *Certified* STEELS



Meet Definite Specifications—Pass Rigid Inspections

● Ryerson Certified Steels are the result of many years of planning, developing new specifications, new methods of control and complete readjustment of stocks. Definite specifications and rigid inspection systems now assure the qualities most desired in each class and type of material. Special handling and warehousing methods protect these qualities and make possible immediate shipment of every requirement—large or small.

Let us give you the complete story of Ryerson *Certified Steels*. Write for Booklet JI. JOSEPH T. RYERSON & SON, Inc., Chicago, Milwaukee, St. Louis, Cincinnati, Detroit, Cleveland, Buffalo, Boston, Philadelphia, Jersey City.

Ryerson Stocks Include:

Alloy Steels—Tool Steels
Heat Treated Alloy Steel Bars
Stainless Steel
Hot Rolled Bars—Hoops and Bands
Cold Finished Shafting and Screw Stock
Extra Wide Cold Finished Flats
Beams and Heavy Structural
Channels, Angles, Tees and Zees
Rails, Splices, Spikes, Bolts, etc.
Plates—Sheets
Strip Steel, Flat Wire, etc.
Boiler Tubes and Fittings
Welding Rod—Mechanical Tubing
Rivets, Bolts, Nuts, Washers, etc.
Reinforcing Bars
Babbitt Metal and Solder

RYERSON STEEL-SERVICE

THE IRON AGE

December 23, 1937

ESTABLISHED 1855

Vol. 140, No. 26

The Fable of the Kind Hearted Sea Captain

IT is nice to know that the editorials in THE IRON AGE are read. We do have evidence of this sort from week to week but it is not often that we get response of the kind received this week from Tell Berna, general manager of the National Machine Tool Builders' Association.

Inspired by the recent fables of the nude eel, the frogs and the hens which have appeared successively on this page, Mr. Berna has composed and sent us an original fable concerning a kind hearted captain. It is as follows:

ONCE upon a time there was a sea captain who was a very nice man, and he had a lovely voice.

He had unusual ideas about navigation, too. His first officer liked to steer west. He liked sunsets. But some of his other officers liked to steer east. They liked sunrises. So when the first officer was on the bridge they went one way and the rest of the time they went another. Naturally, they didn't get anywhere. The line that owned the steamer piled up a large deficit. Occasionally the owners of the steamer would grow impatient, but the captain would talk to them by radio phone, and they always accepted his explanations because he had such a lovely voice.

But one day there was a storm, and as the crew persisted in its usual custom of obeying the inspiration of the moment, things went from bad to worse, and the steamer sank.

Some of the crew managed to launch a life-boat, others jumped into the sea. Very soon the life-boat had picked up so many of the crew that it was crowded to capacity, and other sailors were in the water, clinging to the life rope at the gunwales of the boat.

Then the captain said, "One third of our crew is still in the water. We must pull these men aboard too."

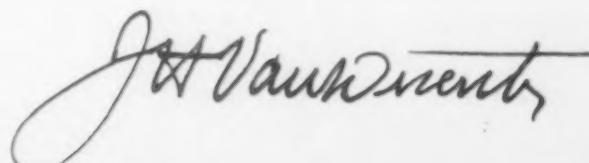
And one of the seamen replied, "Captain, they won't drown, and if we pull them aboard she'll sink."

"Nonsense," said the captain, "they are in water up to their ears—and while it is true that they have hold of the life rope, they are just as much entitled to be in this boat as we are."

So they pulled the men aboard, and the life-boat sank in deep water and all were drowned.

The moral of this tale is that this is a tough world, and it gets especially tough when emotion takes the place of common sense.

CERTAINLY Mr. Berna ought to know, because he has seen emotion knock the props from under the American machine tool business during the past few months.



Welded Passenger Cars of High-



BELIEVING that the trend of railroad purchasing is toward light-weight equipment, Pullman-Standard Car Mfg. Co., Chicago, is combining welding high-tensile low-alloy steels, and aluminum in a production system that includes several unusual developments, and results in passenger equipment which is nearly 50 per cent lighter than conventional cars, and freight cars which are about 20 per cent lighter.

New facilities are being provided at Michigan City, Ind., where Pullman-Standard plans to build welded low-alloy steel freight cars on a straight-line production basis early in 1938, but complete details are not yet available. An article covering this phase of Pullman-Standard's activities will appear in *THE IRON AGE* early next year.

Production of welded low-alloy steel passenger cars is well underway, however, at the company's plant at Pullman, Ill., and it is with this work that we are immediately concerned.

Pullman-Standard has equipment available for welding all types of alloys. The company chooses the material to be used, however, with regard to the particular strength requirements of the job at hand, and with the thought in mind of obtaining the greatest possible economy. The lightest cars are made of riveted aluminum construction, which, especially in high-speed passenger trains running over mountainous grades, has been used very successfully, according to the company, and is recommended where the saving in operating costs will more than offset

the additional purchase price of the cars.

Next lightest in weight are welded cars of high-tensile low-alloy steels which weigh only 8 or 9 per cent more than those of aluminum, and may be built at a somewhat lower price.

Stainless steel cars, fabricated by the spot-welded process, weigh the same as those made of high-tensile low-alloy steel, but cost

considerably more than either the low-alloy car or the aluminum cars, according to Pullman-Standard. The company, interested chiefly in the economics of the question, believes that in the long run "the majority of steel cars will be built of moderate priced alloys and that when extreme light weight is desired, aluminum will be used," and is already, therefore, confining its efforts to aluminum



Tensile Steel and Aluminum

By ROBERT G. BINGHAM

Western Editor,
The Iron Age, Chicago

and high-tensile low-chrome alloy steel in the design and construction of its lightweight cars.

Further explanation of this preference, as stated by the company, reveals that aluminum and low-alloy cars, although not claimed to be stronger than the conventional passenger car, are equal in strength in withstanding buffing shocks and that they comply fully with Railway Mail Service Specifications,

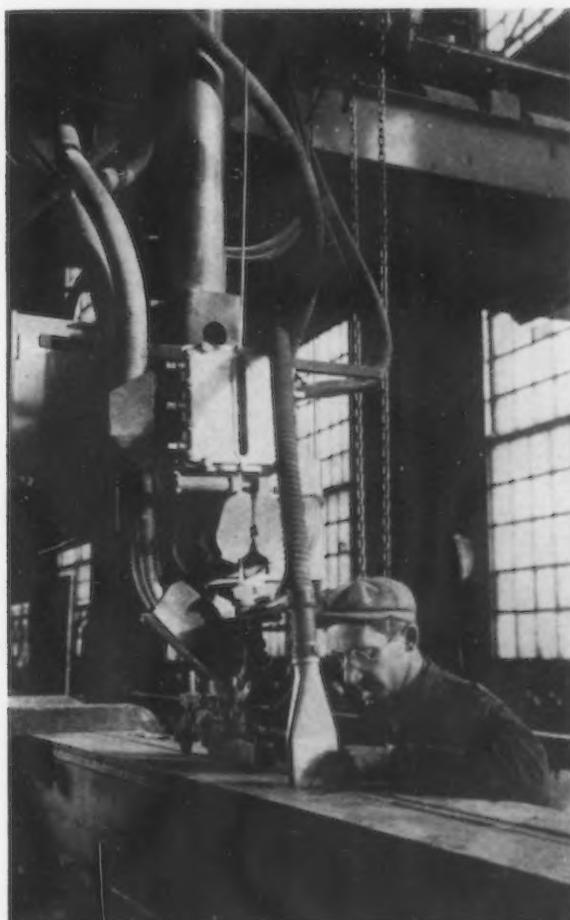
the basis upon which all passenger-carrying cars are constructed. High-tensile stainless steel and aluminum structures, however, when designed on stress calculations and when subject to buffing and other live loads, present too much flexibility, states Pullman-Standard. Because of the resiliency of these two materials greater deflections are exhibited in the high-tensile state than is the case with

low-chrome alloys for the same cross-sections when subjected to identical loads. Consequently, the company has found it necessary in order to maintain the proper strength and rigidity of car structure, to increase the cross-section of the load-carrying members made of aluminum or high-tensile stainless steel so as to keep the amount of deflection within satisfactory limits. In aluminum this addition may be satisfactorily made, and the resulting weight is still considerably under that of corresponding members built of any of the alloy steels. In stainless, however, the weight is increased, since a cubic foot of steel weighs the same whether high-tensile stainless or low-alloy, and the cost rises as well. Even though stainless steel has a higher tensile strength in the cold-rolled state than low-alloy steel, this company maintains that its relatively lower modulus of elasticity makes it impossible to take advantage of this added strength. The strength of low-alloys being adequate therefore for requirements, and the cost less, they are being chosen over the other materials.

AT LEFT
INTERIOR of car
with frames and
sides welded.

• • •

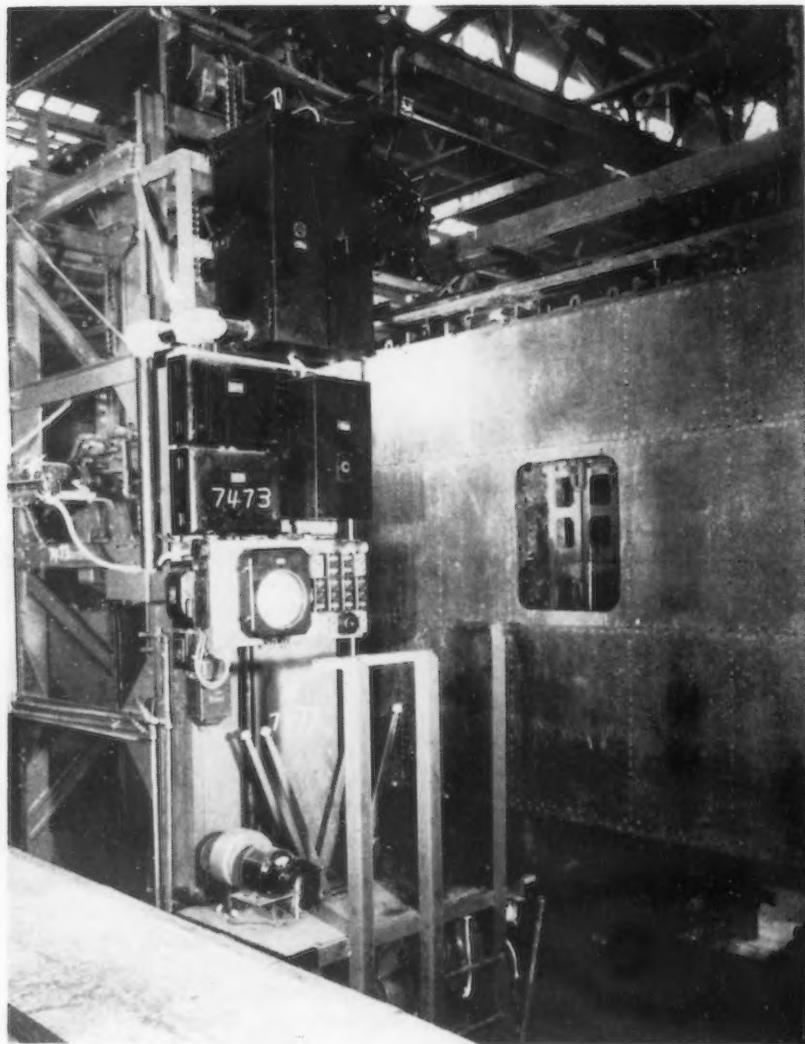
AT RIGHT
A "VACUUM
CLEANER" fol-
lows the weld on this
center-sill and picks
up the unused weld-
ing powder flux.



THE IRON AGE, December 23, 1937—27

Pullman-Standard, being well pleased with the success of its welding experiments, has thus far built or has under construction a total of 283 passenger car structures. The chief advantages of all-welded cars, Pullman-Standard has found, are their light weight, low maintenance cost, smooth outer body surface, and adequate strength.

Foremost among the interesting new production aids this equipment builder has designed are the unusually large jigs upon which side and roof sheets are assembled and



ABOVE

TRAVELING welder for spot welding in both vertical and horizontal directions.

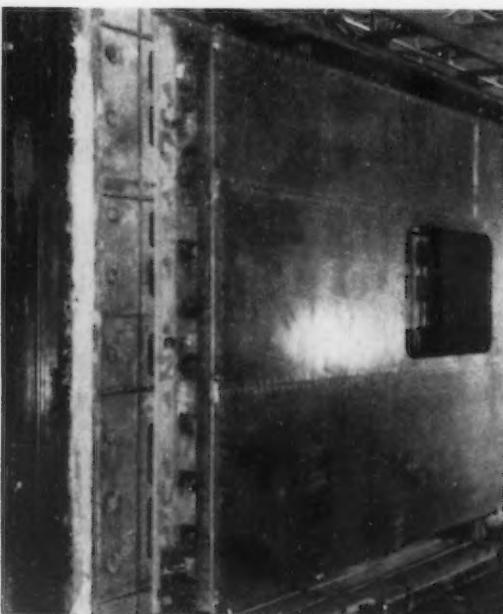
• • •

AT RIGHT

SIDE sheets spot welded to welded frame.

pieces are continuous whereas the longitudinal members of the side are backed up by pieces that fit between the posts. The "I" section castings are bolted to the permanent portion of the jig by "U" clamps. The bolt heads engage the slots in the bed castings.

The clamping of the framework posts, side plate, window headers, belt rail, and side sills is done temporarily by sliding "C" clamps. After the framework is welded, the jig clamps are used and the sliding "C" clamps are removed. The clamps that hold the framing to the jig while the side is spot welded are attached permanently to the jig. At the side plate, pivoted hook bolts with turn buckles are used. One hook bolt is used at each post location. A similar arrangement is used for clamping the side sill. No clamps are



spot welded, to form when finished, a complete side and roof, each in one piece.

The vertical side-assembly jig for spot welding the sides of the cars is set in concrete 5 ft. 6 in. below the shop floor. The framework is made up of structural shapes and welded. Two rows of H-beams, spaced 5 ft. apart and having diagonal braces between them, act as a base for the jig. These beams, 8 in. a row, 13 ft. 4 in. high, are spaced 12 ft. 2 in. center to center, making the overall length 85 ft. 2 in. center to center.

Cast iron bed plates 4 ft. 3 in. high and 12 ft. 2 in. long are mounted to the steel structure, two being required for the height which is 8 ft. 6 in. Four rows of tee slots are placed in the face of the bed plates, with longitudinal spacing of 9 1/8 in. The description up to this point covers the permanent part of the jig.

To the face plates is applied the portions of the jig that change with respect to plan arrangement. These parts consist of "I" section castings on which are mounted 1 in. thick copper bars. The total depth of the assembly is 13 7/32 in. Post

used for the window header and belt rail. The post clamps consist of a short slotted bar welded to the post backing piece. Engaging this on one side is a hook-shaped bar—one end of which passes through a hole in the flange at the window opening, the other end being secured by driving a wedge between it and one end of the slotted bar. On the other side is placed a similar hook-shaped bar, one end of which passes over the inside flange of the post, the other end engaging the slotted bar and secured by a wedge.

After the jig frame clamps are

in position, the side sheets are applied. They are held temporarily by sliding "C" clamps. Self-tapping screws are then used for holding the sheets to the framing while the side is spot welded.

The spot welding of the side and arc welding of the frame, which consists of pressed posts of the same low-alloy steel as composes the side sheets, is accomplished in 4½ hr.

This spot welding process calls for an electric spot welder, designed especially for this work, which welds vertical or horizontal rows of spots, automatically spaced, and makes use of the "series" principle. A ratchet drive device which spaces from 1 to 5 in. in ½-in. steps by means of a lever, permits adjustment of spacing between the two electrodes which

are mounted on a slide. The operator merely makes the proper adjustments as to spacing, then starts the machine and stands by to watch the welding operation until the end of a row is reached, when it is stopped and another row begins. The 14-gage sheets are attached to the frame by approximately 6000 spot welds.

When welding vertically, a chain drive pulls the welding unit up and down the side of the jig, while horizontal movement is along a track, the entire carriage being moved. A rack drive eliminates slippage, and power to the transformer is delivered by means of two trolley wires in contact with double trolley shoes on each wire.

An electronic relay accurately controls welding current, and also controls a magnetic contactor. This timer energizes the magnetic contactor and welding electrodes at precisely the same point every time in the AC voltage wave, an unusual feature which saves wear on the electrodes. A dial switch in the control cabinet adjusts the welding time.

The welding spots are invisible after the car sides have been painted, so that a feature of this construction is in the smooth outer surface obtained.

The completed side is removed from the jig and transported by slings from an overhead crane to an assembly section of the plant where underframe, sides and roof are riveted together, the only major non-welding operation on the car.

The jig upon which the roof sheets are welded to the frame is arched in the same shape as the completed roof, and is set in concrete, the top of concrete being on the same plane with the surrounding floor. It is composed of individual units, one being required for each carline. The base portion is made of structural members on which is mounted a gray iron casting having an arched profile. To this curved portion of the casting is fastened a 1½ in. copper bar which is exactly the same contour as the inside of the carline. Carlines are held to the jig by clamps. There are nine double clamps welded to the gray iron casting. A set screw in the top of the clamp allows for adjustment of the tension.

Two wooden units are placed between each of the jig units and are notched out for roof stiffeners. The wooden units act as supporting means for the roof sheets between the carlines, and also serve as a backing for the clamping arrangement.

The roof sheets are held in position by means of bands. One band on top of the roof from side plate to side plate is placed on each side of each roof sheet joint and is tightened by eccentric clamps which are secured to each side of the base portion of the jig unit. In addition to these, a similar clamping arrangement is used at the wooden support units. This is anchored to rods that engage the "T" slot on each side of the jig.

The length of jig set up is determined by the length of the car but spot welding accommodation

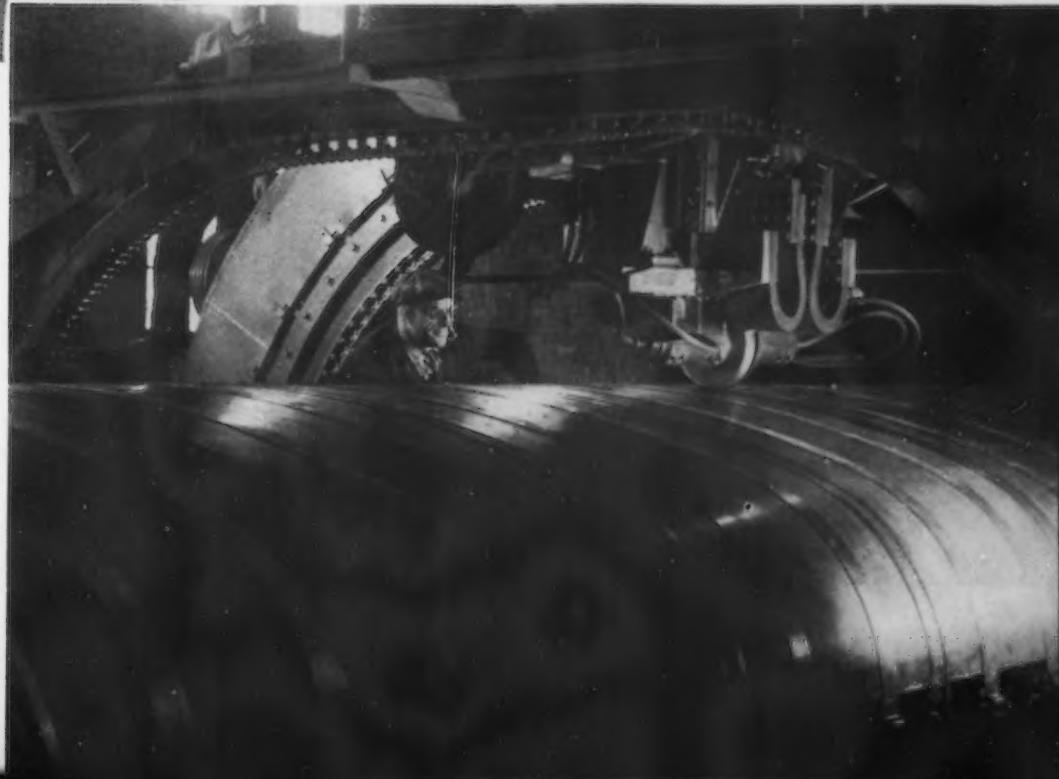


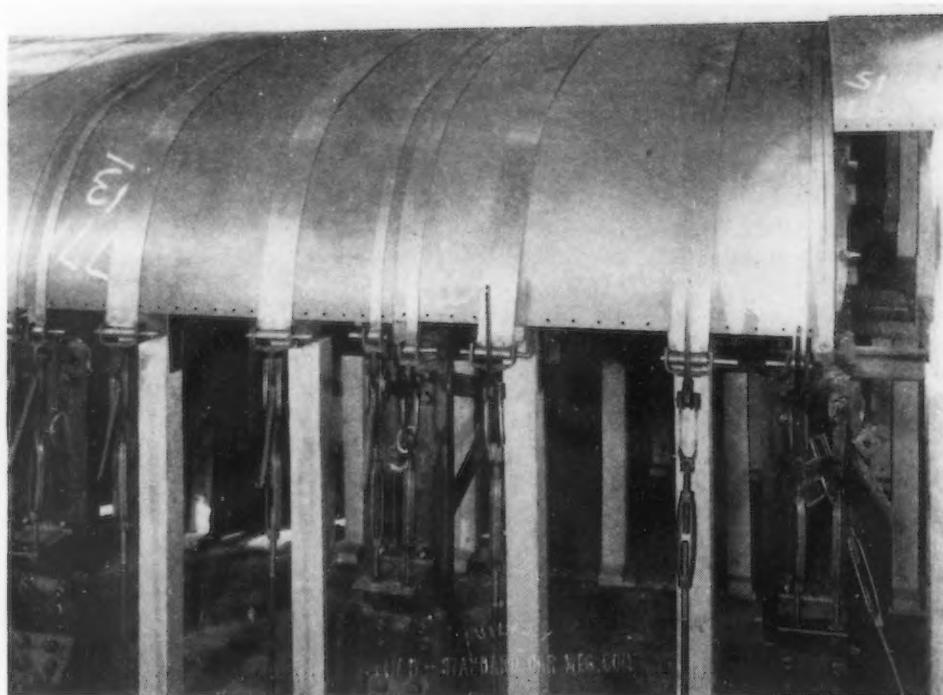
• • •

AT RIGHT

BANDS, adjusted by turnbuckles, hold the roof sheets in place for jig welding.

• • •





ANOTHER view of
the roof jig.

for travel is approximately 83 ft. The width of the jig is 10 ft.

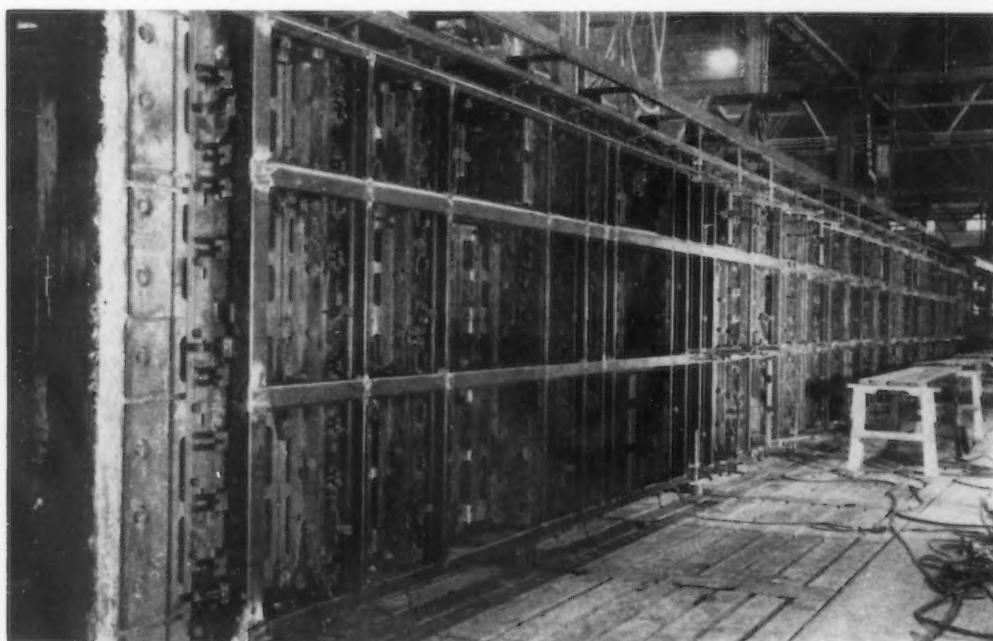
The spot welder used in the roof operations is most interesting and novel. The "series" principle is again used, two 12-in. diameter, roller electrodes conducting the current into the work. These rollers, under pressure, spot weld the seam as they roll along the roof sheets in contact with the steel. The welds are spaced at desired distances by interrupting the welding current at pre-determined

intervals. Welding pressure on the rollers is supplied by two independently controlled air cylinders. The welding unit itself is mounted on two heavy I-beams formed in the shape of the car roof, and travels along these beams by means of a motor and pinion engaging a rack.

An electronic relay, similar to that used in welding the side sheets, is again employed here for timing the welding current. It is understood that this type of control is

most accurate, the length of time that the current is off determining the space between welds, as the rollers maintain a constant rate of speed.

The two electrodes in the "series" system of welding as used by Pullman-Standard in this instance, are both on the same side of the work, the welding current being transferred from one electrode through the work to the copper face of the jig and back again to the other electrode. Time re-



VERTICAL jig for
welding entire
side frame.

quired to spot weld the roof sheets is $4\frac{1}{2}$ hr., making the total assembly time for the two sides and roof, $13\frac{1}{2}$ hr.

Aside from the upper portion of the car, the underframe requires another unusual welding machine which seam welds the center sill of the underframe, composed of two A.A.R. Z-bar sections. This welding device travels along the seam, straddling it, on two small guide wheels. An overhead reel provides

a constant feed of welding wire which is melted by the current on reaching the seam. A powdered flux is distributed ahead of the electrode wire after which the unused portion is picked up by a vacuum cleaner attachment for further use.

One of the new type Pullman cars which is being assembled by the processes just described is the "Roomette" car, which has 18 completely enclosed private rooms, each

containing one bed, which folds into the wall during the day, leaving a comfortable seat, individual and complete toilet facilities, individual air conditioning, and wardrobe closet. Some of these cars are expected to be placed in service early next year on the Santa Fe, New York Central, Pennsylvania, Union Pacific-Northwestern, and Southern Pacific. At present about 38 are being constructed.

Said to Be World's Largest Industrial Truck Battery

THE storage battery illustrated herewith is claimed by the Electric Storage Battery Co. to be the largest ever built for electric industrial truck use. The complete 16-cell battery, assembled in a steel tray, occupies a space of 26 in. by 51 in., and weighs $2\frac{1}{2}$ tons. Rated at 1080 ampere hours at a normal six-hour discharge, the capacity is 33 kw.-hr. The Automatic Transportation Co.'s type THTF truck, as shown, is the first commercial industrial truck to be equipped with this super-type battery. In double-shift service, the steel tray assembly permits quick exchanges and continuous, dependable service through the use of duplicate batteries, as the steel tray is readily lifted from the truck when one battery is discharged and a freshly charged battery installed in its place.

This type of battery has been designed and built not only for the big trucks of today, but for the bigger trucks of tomorrow. There seems little reason to doubt the idea that materials-handling trucks will be bigger in the future, and will require more power to operate them. The production of a super-capacity type of battery, therefore, is strictly in line with the needs of the times.

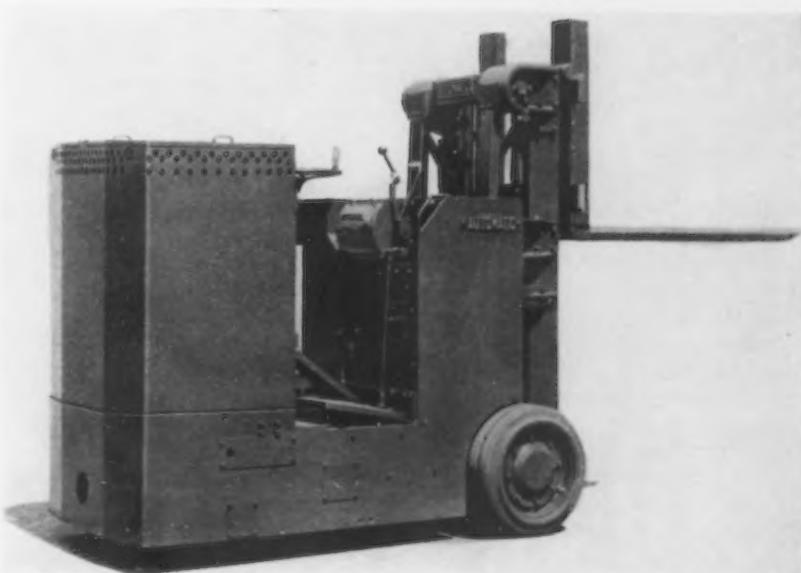
AT RIGHT

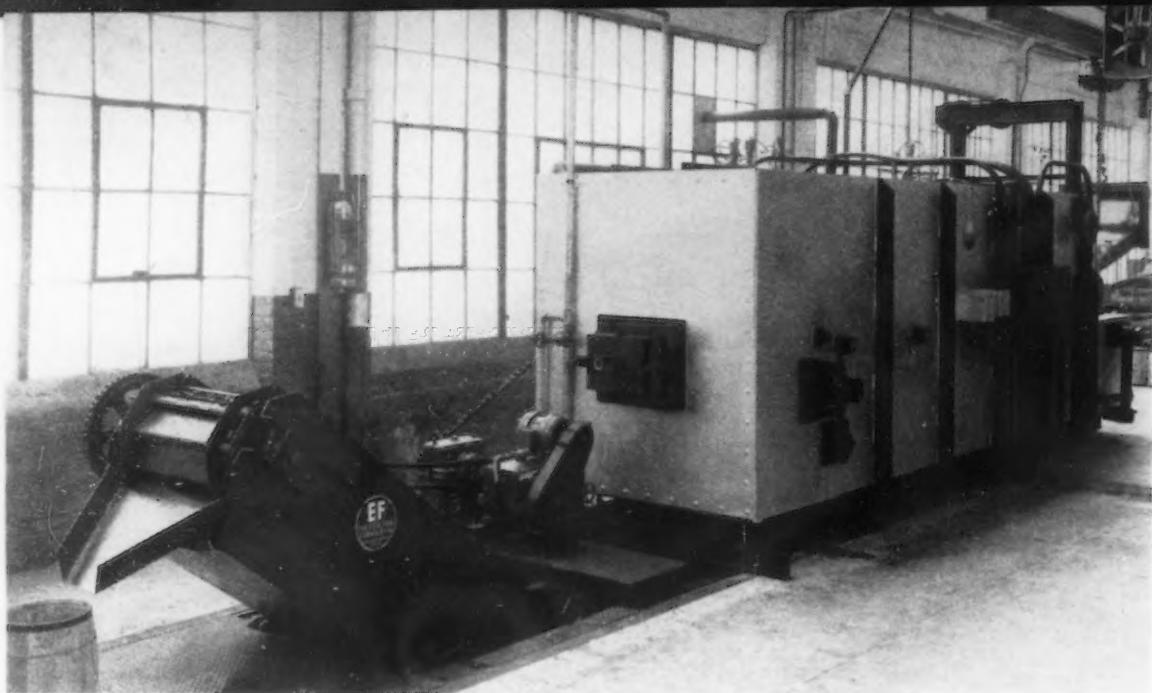
FIG. 1—World's largest industrial truck battery; capacity 33 kw.-hr., $37\frac{1}{2}$ in. high.

• • •

BELOW

FIG. 2—Automatic type THTF truck; first to use world's largest truck battery.





Electric

W. F. ROSS

Engineer,
The Electric Furnace Co.

VIEW of the discharge end of the furnace showing the quench tank located below the floor level to which the bolts are dropped directly from the traveling conveyor. The material is then automatically conveyed from the quench tank by the flight conveyor shown in the foreground.



THE numerous applications of the lowly bolt in this modern machine age are so common and varied that we are likely to minimize the importance of the bolt itself. However, a study of the important functions filled by this apparently insignificant little fastening device shows that much experimental labor and study has been spent in producing a commercial necessity which will be not only extremely inexpensive, but also endowed with a maximum of physical strength, combined with an irreproachable finished appearance.

The old fashioned carriage bolt, which was in its time quite indispensable, would be practically useless in today's high speed and high vibrational mechanical application. The highly developed bolt of today is not only exemplary in its fine machining, but sold with the guarantee of physical characteristics of strength and durability that the up-to-date bolt purchaser demands and receives.

Development of steels and steel alloys has done much toward providing bolts and unlimited life and endurance. However, the methods employed in heat treating bolts to produce a perfect finished product have been lead toward perfection in great steps during the last few years. Perhaps the greatest step

forward has been the trend toward electrical heat for bolt treating.

Typical bolt hardening equipment of the most modern type is a key factor in the production of numerous sizes and kinds of bolts in the plant of the Cleveland Cap Screw Co. at Cleveland.

Electric furnace equipment recently installed in this company's plant is of the continuous, chain belt conveyor type, designed for the scale-free hardening of bolts at a temperature of 1600 deg. F. The furnace chamber consists of a fabricated steel shell lined with insulating material and refractories to form a tunnel, through which the continuous conveyor passes. Upon the hearth or floor of this chamber is placed a series of nickel-chromium alloy bars, which elevate the lower flight of the endless chain conveyor above the refractory hearth.

The hearth proper, formed by the upper flight of the chain belt, is supported on a series of grid type alloy plates supported on beams mounted under the upper flight of the conveyor.

Suspended from the roof of the heating chamber and at a level just under the upper flight of the conveyor belt, are placed heating elements, which consist of heavy cast nickel-chromium alloy grids, so designed as to present a maxi-

mum of radiation area to the interior of the furnace chamber. These grids form two furnace sections or zones, each of which is arranged to take energy from three phase transformers. Each zone is automatically controlled by means of pyrometers, which, through the medium of relays, operate heavy quick-break switches operating under oil according to the impulse of thermocouples terminating within the furnace chamber. The power supply for the secondary of the transformers is carried directly to the furnace heating elements through these quickbreak switches.

The belt conveyor forms an endless chain, the discharge end of which is carried within the furnace chamber and the charging end extended a short distance out of the furnace chamber in order to facilitate the loading of work. Thus it is seen that the whole length of the conveyor, with the exception of the short distance at the loading end of the equipment, is at all times under heat within the furnace chamber. This is done in order to conserve the heat absorbed by the conveyor itself, which would otherwise be lost to the atmosphere if the return flight of the chain belt were run outside and under the furnace chamber.

Directly under the discharge-end drum of the conveyor within the furnace chamber there is placed a

c Heat Hardening of Bolts

chute extending vertically downward into the loading end of a mechanical quench tank. Thus the work is carried from the charging end of the furnace equipment through the furnace chamber on the continuously moving chain belt, and allowed to drop from the chain belt directly into the quenching medium.

An endless belt running within the quenching medium receives the pieces directly from the furnace, carries them a short distance under the level of the quenching fluid and then carries them upward to a point at which the pieces are easily unloaded into boxes as they fall from the conveying belt.

The design of this equipment is such that one man, continuously loading bolts at the charging end of the furnace, can easily supply what supervision is necessary for the entire hardening and quenching process.

The appearance of the furnace equipment and the quench tank are well illustrated in the accompanying photograph. Some idea of the size of the equipment may be gleaned from the overall dimen-

sions, which for the furnace are: 22 ft. 6 in. long by 6 ft. wide by 10 ft. 3 in. high overall. The quench tank with its mechanism is shown with its loading and extending under the discharge end of the furnace.

The quench tank itself is 18 ft. 3 in. long by 4 ft. 5 in. wide.

Perhaps the most interesting phase of the operation of this equipment is the means by which the various bolts are kept from oxidizing while in process. It is a well known fact that steel at the higher temperatures is detrimentally affected by atmospheric oxygen in the air in that an iron oxide scale, similar in chemical composition to rust, is formed upon the piece.

To overcome this, the furnace chamber is made as gas-tight as possible and then purged of air by means of a continuously flowing stream of inert gas. This gas, which is usually referred to as a "special atmosphere," is composed of the products of combustion formed by the burning of ordinary natural gas or its synthetic equal, manufactured gas. The prior com-

biting of atmospheric oxygen with the carbon and hydrogen elements of the raw gas removes the free oxygen which might otherwise attack the work as it rises to its high temperature within the furnace chamber.

As the bolts are continuously within this special atmosphere until the moment when they drop from the conveyor belt into the quenching medium, the work is brought from the quench in a clean, scale-free condition and similar in appearance to the unhardened stock being charged into the furnace.

The connected load of this equipment, insofar as the heating capacity is concerned, is approximately 150 kw. hr. per hr. The production of the furnace, which is approximately 1000 gross lb. per hr., varies according to the size and weight of the bolts run, the ability of the bolt material to absorb heat and the density of loading upon the conveyor belt.

The equipment described, was designed and manufactured by the Electric Furnace Co. of Salem, Ohio.

THE charging end of a 150 kw., controlled atmosphere, continuous chain belt conveyor furnace for scale-free hardening 1000 lb. of cap screws, bolts, etc. per hr. The feed chute is loaded in the position shown and elevated so that the bolts will gradually feed onto the traveling hearth and be conveyed through the furnace. The Elfurno generator for producing the special protective atmosphere may be seen in the background behind the panel board on which are mounted the switches, recording and controlling equipment. The transformer for this equipment may be seen mounted above the panel board.



Lubrication of Pinions and Roll Neck B

Part II

• • •

By JOHN F. PELLY
Lubrication Engineer, Bethlehem
Steel Co.

• • •



IN a previous issue the author presented some information on the lubrication of gears and pinions. The remainder of the article, devoted mainly to roll neck bearings, contains much data on bakelite composition, or fabric bearings which have now become definitely established in steel mill practice.

Originally introduced for high speed, light load conditions, as in rod mills, where babbitt bearings have always caused trouble, fabric bearings have gradually been adopted for heavy loads and moderate speeds, in blooming mills, plate mills, and large structural mills. They are also giving good results in bar and billet mills and small structural mills. When their true value is fully understood and operating men have become familiar with the few simple requirements incidental to their successful use, they will probably displace all plain bearings wherever clean, cool water is available for lubrication.

Bakelite composition bearings are manufactured by impregnating layers of woven fabric with resin, and subjecting the mass to heat and pressure in a hydraulic press. The most important reason for using this type of bearings is the saving in

power cost over plain bearings. This saving will be illustrated by examples in the following. Each type of mill, however, has its own arguments for or against these bearings. The strongest objection offered by mill men is the necessity of truing up the necks and lining up the housings. To this can be answered that both of these refinements should be insisted upon, even with plain bearings, as a matter of ultimate economy.

Fabric Bearings in a Rod Mill

Keeping grease on the neck of high speed rod mills has always been a difficult, dangerous, and therefore, frequently neglected operation. The discovery that wood bearings running on water

will stand up in this service was therefore a great relief. Lignum vitae bearings were gradually installed in a Bethlehem rod mill during the years 1927-1930. During 1930, fabric bearings were also tried, but they were not used to any great extent until 1936. An interesting comparison of the power readings for a 17-stand rod mill is given in Table 1. As shown in this table a 30 per cent reduction in power was obtained through the use of fabric bearings on 14 of the stands.

Fabric bearings were tried on stands 0, 1, and 2, but without success, due to the slow speed (34 ft. per min. for stand 0). A set of fabric bearings was removed from stand 3 (speed of neck 117 ft. per min.) after rolling 125,000 tons. Brass and babbitt bearings in this stand had a life of only 11,000 tons, or three weeks.

An average life of 3200 tons was found for brass and babbitt bearings on No. 15 and 16 finishing stands. Fabric bearings have been used on these stands for nearly two years, rolling 200,000 tons, and are still in service. The collars have of course been replaced several times. The rollers claim that they can hold the mill better on fabric bearings, make a better rod, closer to gage, and have an appreciable saving on guides, spindles, couplings, and grease. With fewer adjustments and changes of bearings, increased production is obtained. Maximum neck speed on this mill is 2150 ft. per min.

A report on fabric bearings for another rod mill gave 246,125 tons for No. 12 stand after four years; 305,219 tons for stand No. 13 after five years, and 277,202 tons on stand No. 14 after four

TABLE 1—POWER REQUIREMENT ON ROD MILL FOR DIFFERENT TYPES OF BEARINGS

| Year | Power Kw. hr./ton | Bearing Material |
|------|----------------------|---|
| 1926 | 117.4 | Babbitt and brass |
| 1927 | 121.7 | First lignum vitae |
| 1928 | 114.3 | |
| 1929 | 110.7 | |
| 1930 | 92.0 | |
| 1931 | 86.5 | Increasing number of lignum vitae |
| 1932 | 85.8 | |
| 1933 | 84.8 | |
| 1934 | 83.4 | |
| 1935 | 81.0 | First fabric |
| 1936 | 77.7 | Increasing fabric up to 14 of 17 stands |

TABLE 2—POWER REQUIREMENT SKELP MILL, FOR DIFFERENT TYPES OF BEARINGS

| Year | Kw. hr. Per Ton | Bearing Material |
|------|--------------------|-------------------------|
| 1928 | 61.0 | Brass and babbitt |
| 1929 | 51.9 | Brass and babbitt |
| 1930 | 55.5 | First lignum vitae |
| 1931 | 46.8 | Lignum vitae & fabric |
| 1932 | 39.9 | |
| 1933 | 40.6 | |
| 1934 | 41.2 | |
| 1935 | 41.4 | |
| 1936 | 41.0 | Fabric on 5 of 8 stands |

Skelp Bearings in Modern Steel Plants

years. All of these bearings are still in good condition. For brass and babbitt bearings in the same stands, about 3000-6000 tons was produced.

Fabric Bearings on Skelp Mill

Lignum vitae bearings were installed on No. 8 stand of a 12-in. skelp mill; the amount rolled was 7731 tons. They were then adopted for the other stands which gave an average of 8000 tons, against 2000 tons average for babbitt bearings. For fabric bearings the average was 20,000 tons, with one set on No. 8 stand giving 49,000 tons. The power readings are given in Table 2.

The important power savings made possible by the use of fabric bearings are clearly demonstrated in Table 3, giving the power readings for two individual stands of the 12-in. skelp mill referred to in Table 2. The initial bars measured $1\frac{3}{4} \times 7\frac{3}{4} \times 28$ in., and weighed .6222 tons.

TABLE 3—COMPARISON OF BABBITT, LIGNUM VITAE AND FABRIC

| | Stand No. 7 | Stand No. 8 |
|-------------------|---------------------------------|---------------------------------|
| Bar entering, in. | $7\frac{1}{2} \times 0.225$ in. | $7\frac{1}{2} \times 0.180$ in. |
| Bar leaving, in. | $7\frac{1}{2} \times 0.180$ in. | $7\frac{1}{2} \times 0.155$ in. |
| Kw. hr. per bar | 2.0 (lign. vitae) | 1.525 (fabric) |
| Kw. hr. per bar | 2.535 (babbitt) | 3.4 (babbitt) |
| Kw. hr. per ton | 3.22 (lign. vitae) | 2.45 (fabric) |
| Kw. hr. per ton | 4.07 (babbitt) | 5.46 (babbitt) |

TABLE 4—FABRIC VS. BABBITT BEARINGS

| Mill | Tonnage | | Tonnage |
|-----------------------------|---------|-----------------|---------|
| | Fabric | Condition | |
| 9-in. Merchant, St. 8 and 9 | 30,201 | Worn out | 1,000 |
| 10-in. Merchant, St. 8 | 41,773 | Nearly worn out | 1,250 |
| 13-in. Merchant, St. 1-5 | 124,566 | Hardly worn | 1,500 |
| 18-in. Merchant, St. 12 | 164,236 | Fairly worn | 12,000 |

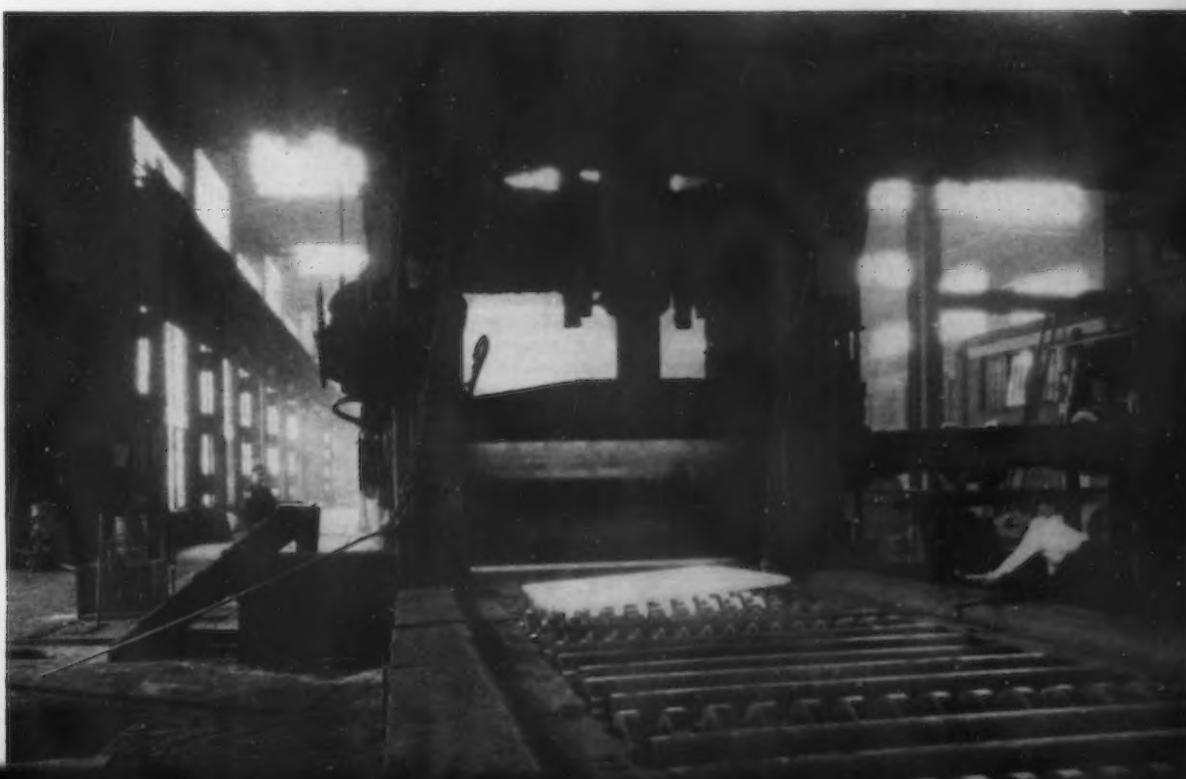
The test shows a reduction in power of 22 per cent, using lignum vitae bearings instead of babbitt bearings, and a 54 per cent reduction for fabric bearings, compared with babbitt.

Data on Merchant Mills

A power test was run on No. 9 stand of a 9-in. merchant mill

while rolling $\frac{1}{8}$ -in. bands at a speed of 70-80 r.p.m. The temperature of the steel was 1650-70 deg. F. Ten billets were rolled on composition bearings and twelve on babbitt bearings. The average power consumption for composition bearings was 48 kw. hr. per ton against 68 for babbitt, a reduction of 29.4 per cent.

One hundred ten
inch sheared plate
mill equipped with
fabric bearings.



Lubrication of Pinions and Roll Neck B

Part II

o o o

By JOHN F. PELLY
Lubrication Engineer, Bethlehem Steel Co.

o o o



IN a previous issue the author presented some information on the lubrication of gears and pinions. The remainder of the article, devoted mainly to roll neck bearings, contains much data on bakelite composition, or fabric bearings which have now become definitely established in steel mill practice.

Originally introduced for high speed, light load conditions, as in rod mills, where babbitt bearings have always caused trouble, fabric bearings have gradually been adopted for heavy loads and moderate speeds, in blooming mills, plate mills, and large structural mills. They are also giving good results in bar and billet mills and small structural mills. When their true value is fully understood and operating men have become familiar with the few simple requirements incidental to their successful use, they will probably displace all plain bearings wherever clean, cool water is available for lubrication.

Bakelite composition bearings are manufactured by impregnating layers of woven fabric with resin, and subjecting the mass to heat and pressure in a hydraulic press. The most important reason for using this type of bearings is the saving in

power cost over plain bearings. This saving will be illustrated by examples in the following. Each type of mill, however, has its own arguments for or against these bearings. The strongest objection offered by mill men is the necessity of truing up the necks and lining up the housings. To this can be answered that both of these refinements should be insisted upon, even with plain bearings, as a matter of ultimate economy.

Fabric Bearings in a Rod Mill

Keeping grease on the neck of high speed rod mills has always been a difficult, dangerous, and therefore, frequently neglected operation. The discovery that wood bearings running on water

will stand up in this service was therefore a great relief. Lignum vitae bearings were gradually installed in a Bethlehem rod mill during the years 1927-1930. During 1930, fabric bearings were also tried, but they were not used to any great extent until 1936. An interesting comparison of the power readings for a 17-stand rod mill is given in Table 1. As shown in this table a 30 per cent reduction in power was obtained through the use of fabric bearings on 14 of the stands.

Fabric bearings were tried on stands 0, 1, and 2, but without success, due to the slow speed (34 ft. per min. for stand 0). A set of fabric bearings was removed from stand 3 (speed of neck 117 ft. per min.) after rolling 125,000 tons. Brass and babbitt bearings in this stand had a life of only 11,000 tons, or three weeks.

An average life of 3200 tons was found for brass and babbitt bearings on No. 15 and 16 finishing stands. Fabric bearings have been used on these stands for nearly two years, rolling 200,000 tons, and are still in service. The collars have of course been replaced several times. The rollers claim that they can hold the mill better on fabric bearings, make a better rod, closer to gage, and have an appreciable saving on guides, spindles, couplings, and grease. With fewer adjustments and changes of bearings, increased production is obtained. Maximum neck speed on this mill is 2150 ft. per min.

A report on fabric bearings for another rod mill gave 246,125 tons for No. 12 stand after four years; 305,219 tons for stand No. 13 after five years, and 277,202 tons on stand No. 14 after four

TABLE 1—POWER REQUIREMENT ON ROD MILL FOR DIFFERENT TYPES OF BEARINGS

| Year | Power Kw. hr./ton | Bearing Material |
|------|----------------------|---|
| 1926 | 117.4 | Babbitt and brass |
| 1927 | 121.7 | First lignum vitae |
| 1928 | 114.3 | |
| 1929 | 110.7 | Increasing number of lignum vitae |
| 1930 | 92.0 | |
| 1931 | 86.5 | First fabric |
| 1932 | 85.8 | |
| 1933 | 84.8 | |
| 1934 | 83.4 | Increasing fabric up to 14 of 17 stands |
| 1935 | 81.0 | |
| 1936 | 77.7 | |

TABLE 2—POWER REQUIREMENT—SKELP MILL, FOR DIFFERENT TYPES OF BEARINGS

| Year | Kw. hr. Per Ton | Bearing Material |
|------|--------------------|-------------------------|
| 1928 | 61.0 | Brass and babbitt |
| 1929 | 51.9 | Brass and babbitt |
| 1930 | 55.5 | First lignum vitae |
| 1931 | 46.8 | Lignum vitae & fabric |
| 1932 | 39.9 | |
| 1933 | 40.6 | |
| 1934 | 41.2 | Fabric on 5 of 8 stands |
| 1935 | 41.4 | |
| 1936 | 41.0 | |

Skelp Bearings in Modern Steel Plants

years. All of these bearings are still in good condition. For brass and babbitt bearings in the same stands, about 3000-6000 tons was produced.

Fabric Bearings on Skelp Mill

Lignum vitae bearings were installed on No. 8 stand of a 12-in. skelp mill; the amount rolled was 7731 tons. They were then adopted for the other stands which gave an average of 8000 tons, against 2000 tons average for babbitt bearings. For fabric bearings the average was 20,000 tons, with one set on No. 8 stand giving 49,000 tons. The power readings are given in Table 2.

The important power savings made possible by the use of fabric bearings are clearly demonstrated in Table 3, giving the power readings for two individual stands of the 12-in. skelp mill referred to in Table 2. The initial bars measured $1\frac{3}{4} \times 7\frac{3}{4} \times 28$ in., and weighed 0.6222 tons.

TABLE 3—COMPARISON OF BABBITT, LIGNUM VITAE AND FABRIC

| | Stand No. 7 | Stand No. 8 |
|-------------------|---------------------------------|---------------------------------|
| Bar entering, in. | $7\frac{1}{2} \times 0.225$ in. | $7\frac{1}{2} \times 0.180$ in. |
| Bar leaving, in. | $7\frac{1}{2} \times 0.180$ in. | $7\frac{1}{2} \times 0.155$ in. |
| Kw. hr. per bar. | 2.0 (lign. vitae) | 1.525 (fabric) |
| Kw. hr. per bar. | 2.535 (babbitt) | 3.4 (babbitt) |
| Kw. hr. per ton. | 3.22 (lign. vitae) | 2.45 (fabric) |
| Kw. hr. per ton. | 4.07 (babbitt) | 5.46 (babbitt) |

TABLE 4—FABRIC VS. BABBITT BEARINGS

| Mill | Tonnage | | Tonnage |
|-----------------------------|---------|-----------------|---------|
| | Fabric | Condition | Babbitt |
| 9-in. Merchant, St. 8 and 9 | 30,201 | Worn out | 1,000 |
| 10-in. Merchant, St. 8 | 41,773 | Nearly worn out | 1,250 |
| 13-in. Merchant, St. 1-5 | 124,566 | Hardly worn | 1,500 |
| 18-in. Merchant, St. 12 | 164,236 | Fairly worn | 12,000 |

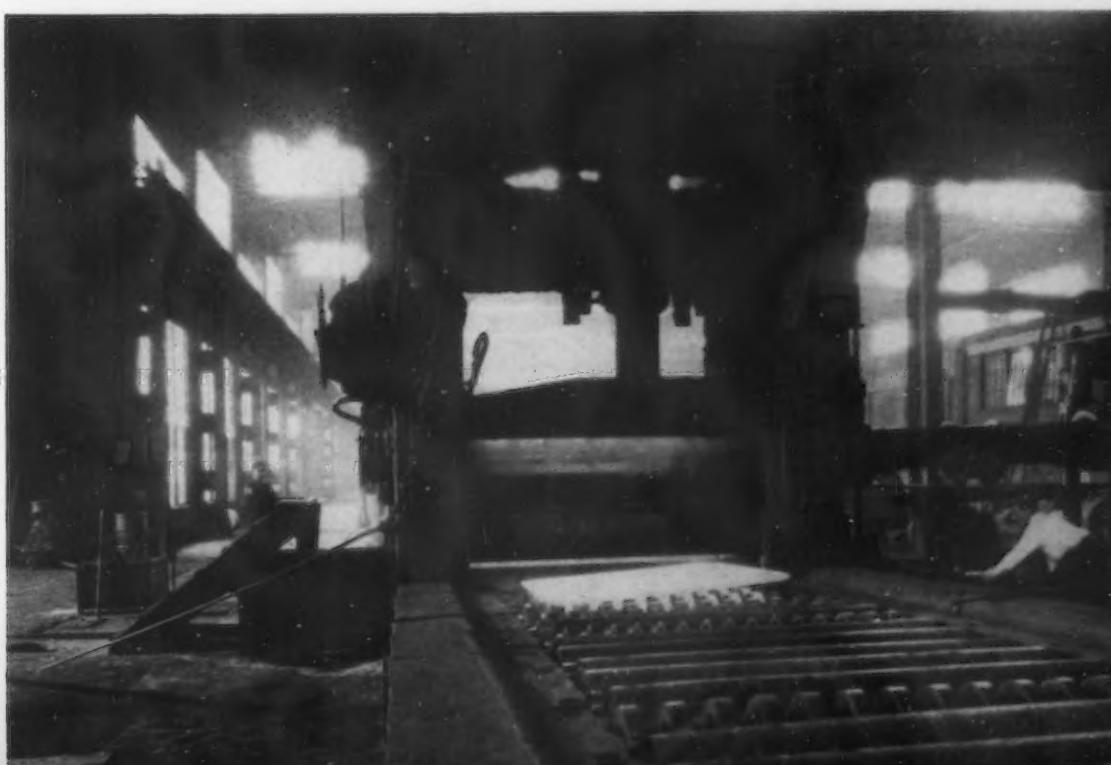
The test shows a reduction in power of 22 per cent, using lignum vitae bearings instead of babbitt bearings, and a 54 per cent reduction for fabric bearings, compared with babbitt.

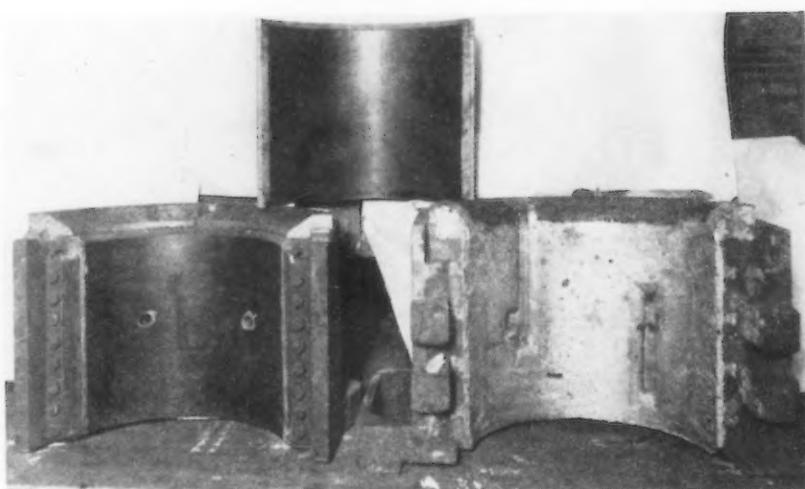
Data on Merchant Mills

A power test was run on No. 9 stand of a 9-in. merchant mill

while rolling $\frac{1}{8}$ -in. bands at a speed of 70-80 r.p.m. The temperature of the steel was 1650-70 deg. F. Ten billets were rolled on composition bearings and twelve on babbitt bearings. The average power consumption for composition bearings was 48 kw. hr. per ton against 68 for babbitt, a reduction of 29.4 per cent.

One hundred ten
inch sheared plate
mill equipped with
fabric bearings.





Fifty-four inch bloomer bearing with fabric lining (left) and babbitt liner (right). Spare fabric liner at top.

An interesting comparison of bearing tonnage on other small mills is given in Table 4.

Continuous Bar Mill

Fabric bearings proved highly satisfactory on a 10-in. continuous bar mill. In No. 1 stand of this mill the 16-in. roll has a speed of 16 r.p.m.; the speed of the 11-in. roll in No. 12 stand is 300-500 r.p.m. Lignum vitae bearings were first tried, but due to intermittent operation they dried out, warped, and cracked. Although good results could probably have been obtained with wood bearings, the new fabric bearing looked more promising, and tests were started with various brands. It was difficult to get comparable data, as top and bottom bearings gave different results and sections producing heavy end-thrusts wore out the thrust collars before the neck bearing showed appreciable wear.

Some of the results obtained are compiled in Table 5.

For comparison, brass bearings on stands 9 and 10 lasted 3400 tons and brass bearings on stands 11 and 12, 4400 tons. This mill is now equipped throughout with fabric bearings, which are working satisfactorily. The surface speed of the necks in No. 1 stand is only 43 ft. per min.

With the slower wear of the bearings, a greater accuracy in the dimensions of the rolled sections is made possible; fewer delays due to adjustments result in increased rate of production; the saving in power approaches 40 per cent, and there is also an appreciable saving in the cost of lubricants. As the results point to a 14 times longer life for the fabric bearing, the actual bearing cost is materially reduced. Less power for driving the mills means less strain and breakage on driving shafts and gears, and

reduced repair of motors. The motor of the continuous roughing mill which occasionally became overheated has had no burned-out coils since fabric bearings were installed, and it has been possible to dispense with the fan cooling system formerly used on the motor for Nos. 11 and 12 stands. Roll necks also have less tendency to overheat, and roll breakage has been reduced.

Comparative results for a 110-in. sheared plate mill are given in Table 6.

For the year 1932, the power consumption for this mill with brass bearings was 43.9 kw. hr. per ton; in 1933, with brass and fabric bearings, 32.2; and in 1934, with fabric bearings exclusively, 23.2 kw. hr. per ton. In considering this reduction in power, several factors must be taken into account, such as for instance the rate of producing

TABLE 6—BEARING DATA ON 110-IN. PLATE MILL

| | Tons on Bearings |
|-----------------|------------------|
| Top, babbitt | 3,575 Avg. |
| Top, brass | 12,510 Avg. |
| Top, fabric | 136,760 Avg. |
| Top, fabric | 208,151 Max. |
| Bottom, babbitt | 24,000 Avg. |
| Bottom, fabric | 58,528 Avg. |
| Bottom, fabric | 71,633 Max. |

steel. However, after making all necessary allowances power saving from the improved bearings is estimated at 40 per cent.

Some interesting data for fabric bearings in a 40-in. blooming mill of another steel company have recently been brought to the attention of the author. One bottom bearing was removed after rolling 760,000 tons; the other bottom bearing is still in service with a record of 900,000 tons. This is a remarkable performance when one considers that hand packed babbitt and brass bearings last for only 60,000-120,000 tons, and that the maximum observed for automatic grease lubricated bearings is 249,956 tons for the top bearing and 433,671 tons for the bottom bearing.

Many other examples could have been cited from mills where fabric bearings have been used to advantage, but the cases given are sufficient to show their merit. Undoubtedly they have won a

TABLE 5—LIFE OF FABRIC BEARINGS ON 10-IN. BAR MILL

| Stand | In | Out | Condition | Tons |
|----------|----------|-----------|----------------------------|---------|
| 12 Top | 12/15/31 | 9/7/32 | Collars broken | 16,674 |
| 7 T & B | 1/5/32 | 1/5/32 | Burned up | ... |
| 11 T | 1/19/32 | 3/28/32 | Collars broken | 5,496 |
| 11 B | 1/19/32 | 10/30/34 | Worn out | 63,377 |
| 9 B | 3/22/32 | | | 90,073 |
| 12 B | 1/8/34 | 6/12/34 | Worn out | 10,824 |
| 12 T & B | 6/12/34 | 1/11/35 | Burned out, no water | 11,220 |
| 11 T | 1/3/35 | 1/24/35 | Worn out | 1,281 |
| 12 T | 1/11/35 | 5/17/35 | No record | 8,559 |
| 12 T | 5/20/35 | 8/17/35 | Collars worn—bearing O. K. | 3,990 |
| 9 B | ... | Dec., '36 | Worn out | 63,994 |
| 4 B | ... | Dec., '36 | Worn out | 45,271 |
| 7 T | ... | Apr., '37 | Worn out | 95,325 |
| 8 B | ... | Apr., '37 | To go in service again | 95,891 |
| 2 T | ... | May, '37 | Worn out | 80,323 |
| 11 T | ... | May, '37 | Broken collar | 87,421 |
| 6 B | ... | June, '37 | Still in | 117,646 |



PHILIP E. BLISS, President, Warner & Swasey Co. Drawn by John Frew for The Iron Age.

permanent place in steel mill operations. The data presented show power savings ranging from 30 to 50 per cent, although in a bloomer, where the energy used in reversing may amount to 25 per cent, only 30 per cent of 75 per cent, or 22½ per cent, actually may be saved. No such power saving is possible with grease lubricated bearings of any type, no matter how well applied. Tonnage comparisons with plain bearings are shown in Tables 7 and 8.

Special Lubricants

No article on steel mill lubricants would be complete without some mention being made of special lubricants, particularly the so-called extreme pressure and increased film strength lubricants. Unfortunately it is very difficult to get real practical data on materials of this type which give convincing proof of the need for these lubricants in a steel mill. In the discussion of pinion and gear lubrication in the first part of this paper, no case was given where anything but a clean lubricant, properly applied, was necessary. This does not prove, however, that cases do not occur where special lubricants may be necessary.

In one case overload was applied to the worm wheel in the screw-down mechanism of a cold strip mill. A lead-base grease was rushed in to replace the cylinder oil previously used; however, the wear is still continuing at a slow rate. The load has moreover never been as great as it was at the start when the worm wheel was actually distorted.

In a Vaughn wire drawing machine the load has recently been increased perhaps 100 per cent after many years' running without noticeable wear. The wear is now serious. Lead-base grease is being used, but no decrease in wear has been observed, although it may still be too early to draw any conclusions.

Comparison is also being made between two cold strip mills, one of which uses extreme pressure sulphonated grease on the roller bearings of the work rolls, while the other is supplied with the same grease minus the extreme pressure element. No apparent

(CONTINUED ON PAGE 70)

TABLE 7—STUDY OF ROLL NECK BEARINGS, PLANT A

| Mill | Type of Bearing | Average Tonnage | Lubrication and How Applied |
|---------------------|--------------------|-----------------|--|
| 54-in. Bloomer | Fabric | 200,000 | Water |
| 54-in. Bloomer | Babbitt and bronze | 112,000 | |
| 48-in. Structural | Babbitt and bronze | 65,000 | |
| 40-in. Structural | Babbitt and bronze | 72,000 | |
| 44-in. Bloomer | Babbitt and bronze | 280,000 | No. 2½ tallow graphite greasing system |
| 36-in. Rail mill | Babbitt and bronze | 51,000† | |
| 32-in. Rail mill | Babbitt and bronze | 40,962 | |
| 40-in. Bloomer | Babbitt and bronze | 236,000 | |
| 40-in. Bloomer | Fabric | 385,000 | Water |
| 30-in. Bar St. 1-5 | Babbitt and bronze | 700,000 | No. 2½ tallow graphite greasing system |
| 30-in. Bar St. 6 | Babbitt and bronze | 57,082 | |
| 21-in. Bar | Babbitt and bronze | 21,726 | Water |
| 21-in. Bar | Lignum vitae | 57,000 | Water |
| 21-in. Bar | Fabric | 121,000 | Water |
| 35-in. Structural | Babbitt and bronze | 271,600 | No. 2½ tallow graphite greasing system |
| 28-in. Structural | Babbitt and bronze | 55,379 | |
| 24-in. Bar mill | Babbitt and bronze | 10,285 | No. 4 tallow graphite block grease |
| 16-in. Bar mill | Babbitt and bronze | 21,303 | |
| 18-in. Bar mill | Fabric | 11,0585 | Water |
| 18-in. Bar mill | Babbitt and bronze | 6,400 | No. 4 tallow graphite block grease |
| 14-in. Bar mill | Babbitt and bronze | 15,501 | |
| 16-in. Bar mill | Babbitt and bronze | 21,303 | No. 4 tallow graphite block grease |
| 12-in. Bar mill | Babbitt and bronze | 10,651 | |
| 12-in. Bar mill | Fabric | 11,620 | Water |
| 12-in. Bar St. 1-6 | Babbitt and bronze | 9,293 | No. 4 tallow graphite* |
| 10-in. Bar St. 7-12 | Fabric | 63,732 | Water |
| 12-in. Bar St. 1 | Babbitt and bronze | 3,374 | No. 4 tallow graphite* |
| 12-in. Bar St. 2-4 | Fabric | 54,955 | Water |
| 8-in. Bar | Fabric | 54,955 | Water |

* Block grease. † Hand grease cups.



THREE-HIGH sheet break down mill with mechanical tables, equipped with fabric bearings.

Fast Metal Melting With Gas Immersion

By J. B. NEALEY
American Gas Association



GAS immersion is a new, ingenious and economical way of melting the soft metals. By this method the heat is located where it is most needed, right in the bath itself. Speed and efficiency over other methods result, and radiation losses through furnace walls and refractories absorption are not only minimized but completely eliminated as no furnace exists. Nor is this method confined to metal melting for it is being applied to heavy materials such as salts, and liquids such as pickling, cleaning, and plating solutions. In steel plant and factory, gas immersion has a wide application, not least of which is heat treating.

Gas immersion heating is simple, alloy tubes for carrying the heat being immersed in the bath. Sometimes one end of the tube is welded to a hole in the pot or tank and a gas burner clamped outside the tank so as to fire through this hole and into the tube or coil. To the other end of the coil is attached an upright piece of pipe to act as a flue. When cutting holes in the pot is inadvisable, a U tube can be used with the gas burner firing down one leg. Another type of gas immersion unit consists of a heating element fabricated from high

nickel-chromium tubing welded in the form of a rectangle. A single burner head, located in the element itself, fires a pre-mixed and completely combustible air-gas mixture, under pressure, into the horizontal cross-over.

This high velocity flame entrains products of combustion from the upper cross-over, setting up a circulation which produces a uniform temperature throughout the entire unit. An air gas pipe and a vent complete the unit. A turn down ratio of 100 to 1 facilitates automatic temperature control. Coils, U tubes or rectangular elements, can be made in any size or employed in multiple according to the extent, speed, and duty of the operation. In fact, the thermal efficiency of an installation can be very accurately estimated at the time it is designed and prior to fabrication.

Another advantage of furnace elimination lies in the fact that the furnace and pot are always hotter than the bath, whereas the reverse is true of this type of heating. With gas immersion heating the pot or tank can be set in a bed of insulating material, to minimize radiation losses. As structural strength for suspension is no longer necessary the pot can be made of much thin-

ner material which effects the dual saving of first cost and fuel consumption for heating the extra metal. Furthermore the walls of the gas immersion heater can be made of very thin material which permits a very rapid heat transfer and high thermal efficiency.

In the field of heat treating a considerable volume lends itself admirably to gas immersion heating. Much hardening and annealing are done in lead and cyanide pots while considerable annealing and drawing are accomplished in salt baths. Here full advantage can be taken of this method of heating. Furnaces are eliminated, pot walls reduced in thickness, insulation is brought to its highest effectiveness, heat up periods are reduced to a minimum, pot life is increased and so on down the list. Also dross formation is materially reduced. In the realm of heat treating the work is more or less intermittent, except when straight line mechanical production has been adopted, and gas immersion is equally effective in both cases.

Perhaps the best way to illustrate what can be done with a lead hardening pot is to cite the experience in another industry, that of printing, where soft metal melting has been brought possibly to its

highest standard of efficiency. There are several applications in the printing business such as type metal melting for linotype and monotype machines and for pigging, lead melting for backing electro, etc. By far the largest application, however, is the melting of newspaper stereotype metal. Nowhere, possibly, has the melting of soft metals been put to the test as in this field. Here the three big factors that promote speed and economy of operation—insulation, automatic temperature control and gas immersion heating—have been most effectively combined.

High Speed Melting Assured

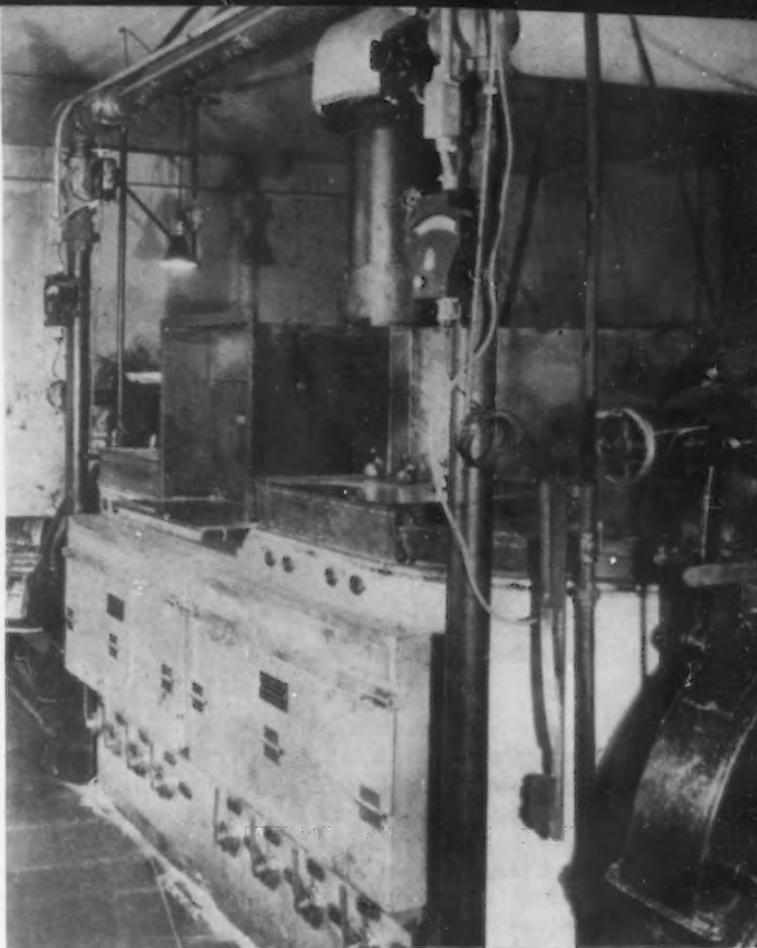
High speed of casting is a vital necessity to this industry and the pots are operated at full capacity during the busy periods. An excellent example is the Chicago *Daily Times*, which recently changed its stereotype pot to gas immersion heating with a saving of approximately 60 per cent in fuel bills. This pot easily furnishes molten metal for two casting machines producing 900 plates daily. Because of the greater heat input with gas the metal is efficiently melted at 585 deg. F., as contrasted with a temperature of 615 deg. F., required to maintain production when electricity was employed. Also a better plate results because the "colder the metal the better the cast."*

These machines are geared to cast 75 lb. plates at the rate of four a minute each and while this is an intermittent operation it is possible, with both machines operating, to cast 480 plates (36,000 lb.) from one pot, every hour.

Lead melting is also a factor in the rubber industry and recently a 60-ton pot with 20 gas immersion heating elements was fabricated for the Goodyear Tire & Rubber Co. While the connected load is 3800 cu. ft. of 1050 B.t.u. gas per hr. the actual hourly gas consumption, with an output of 30 tons per hour at 750 deg. F. will be less. The connected load was purposely made large to allow for spasmodic casting periods when momentarily the actual output would exceed the 30 tons specified.

Tinning is a finish widely applied to sheet steel as instanced by the tin plate mills. Here a double compartment pot is employed, one com-

THE world's largest stereotype melting unit is heated by gas immersion. Holding 12 tons of metal this pot furnishes 38,000 lb. of molten metal per hr. It supplies metal to two automatic plate casters.

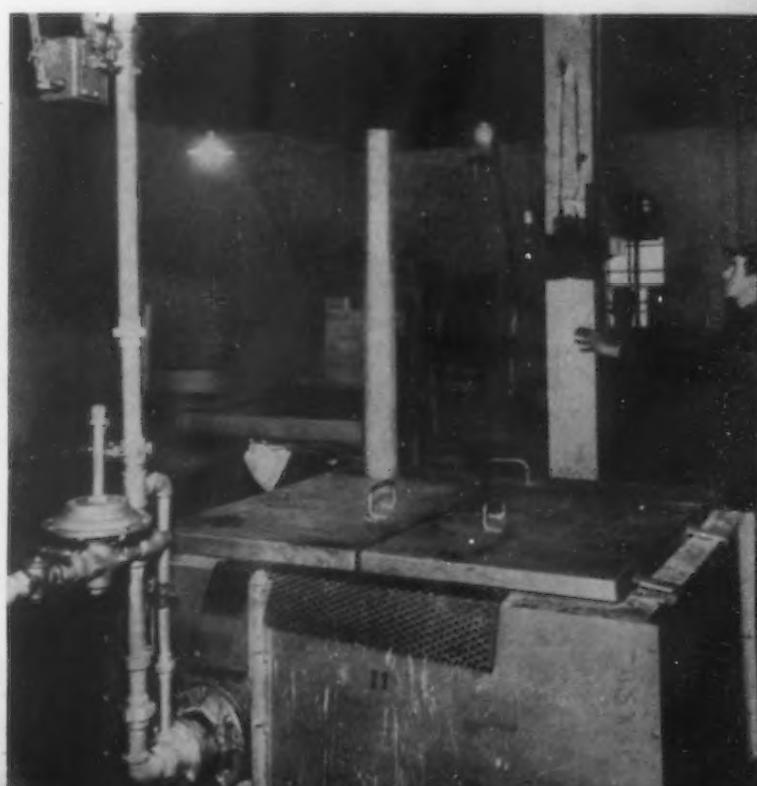


partment for palm oil and the other for molten tin. The movement of sheet steel through these compartments is controlled by motor driven rolls and the tin is most efficiently melted with gas immersion heaters. A pot of this type with immersion heating uses only 23 cu. ft. of gas per base box of product as compared to 42 cu. ft. with the old type while temperature fluctuation has been cut from 15 to 2½ deg. F.

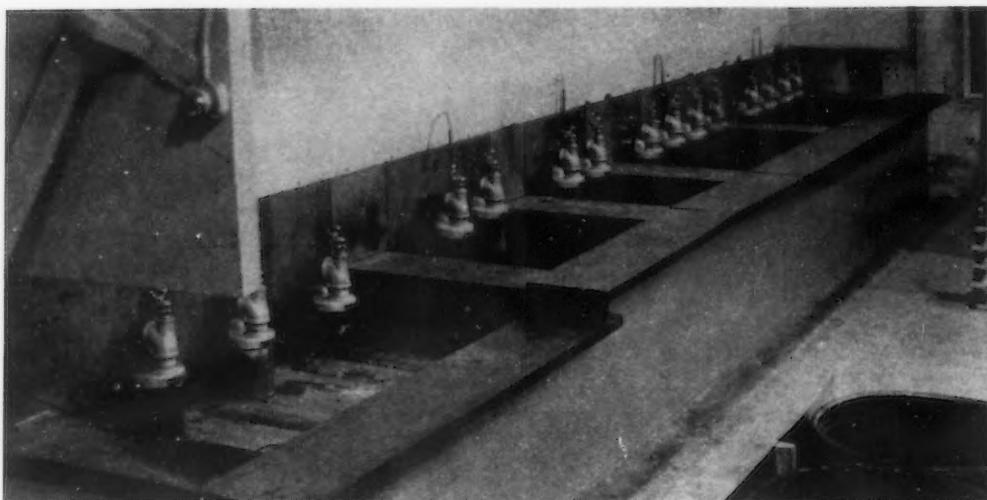
Whereas formerly 1.85 lb. of dross was produced per hour this was cut to 0.47 lb. This is a saving of 45 per cent in fuel and a reduction of 75 per cent in dross formation. At the same time, production was stepped up by almost 15½ per cent or from 260 to 300 boxes per eight hour shift.

Gas immersion is ideally suited to the automotive storage battery industry where it is used in casting

THIS insulated salt bath used for heat treating is heated by gas immersion and is equipped with automatic temperature control and indicating pyrometer. With the top covered as shown a very high degree of efficiency is obtained with this installation.



* Based on the successful operation obtained from the first pot, a duplicate 12 ton pot was installed.



Row of tin pots with economical gas immersion heating. These pots are used for tinning large milk cans when a heavy coat of tin is necessary. Rapid heat transfer for fast melting is vital in order to maintain a high production speed.

storage battery grids of special lead-antimony alloys.

Pots and kettles with gas immersion heating are easily and effectively insulated against heat losses. As a large portion of soft metal melting is intermittent with relatively long idle periods, heat stored in a setting and pot may be dissipated during standby. The advantage of light weight, low heat storage insulating materials is therefore obvious. The lightest weight insulating material is aluminum foil, but it must be correctly crinkled to secure the maximum insulating effect and is therefore somewhat critical to apply. Next to foil in lightness are the newer types of light weight insulating refractories. Temperature controls, while not necessary, are highly desirable and will usually pay for themselves in a short time. They

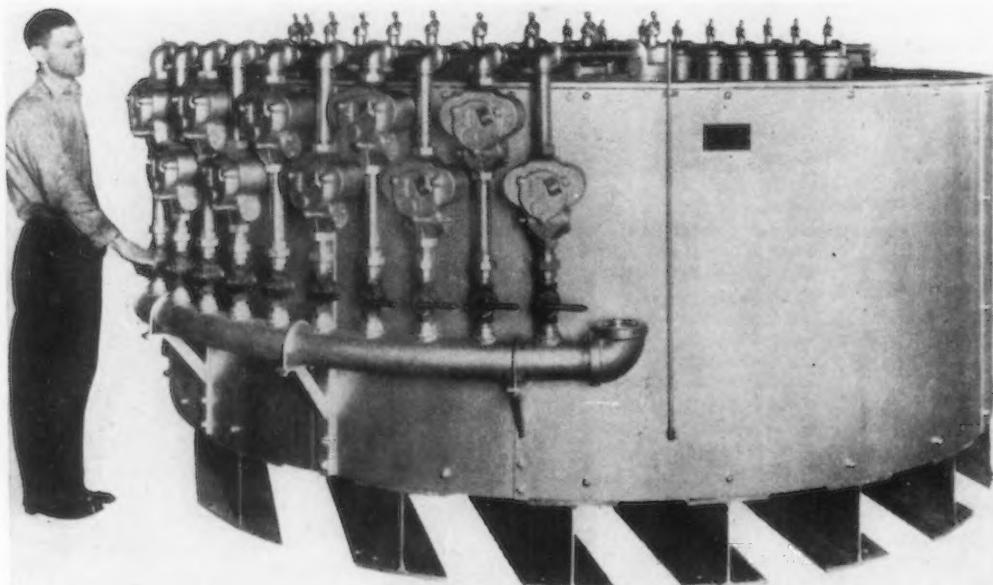
render the installation entirely automatic.

Before closing, a word about gas immersion as applied to acid solutions: There are few metals that will not succumb to the strong acids but lead and even cast iron have proved successful in the weaker solutions. Lead coils for heating pickling solutions of sulphuric acid are recommended and can be used with either wood or metal tanks. Ordinary waste pipe of 4 in. diameter and with a wall thickness of $\frac{1}{8}$ in. is effective.

Lead melts at about 622 deg. F. while water boils at 212 deg. F. and pickles run a little higher, but as the portion of the pipe that is in contact with the high temperature gas flame (in excess of 2000 deg. F.) is submerged in the bath, and since there is an intimate contact between the liquid and the outside

surface of the pipe, the heat is absorbed by the liquid so rapidly that the pipe itself can never approach the melting temperature of lead. It might be added that the heat transfer through lead is less than through wrought iron and copper and the gas consumption will run somewhat higher for the same length of coil, which is indicated by the high flue temperatures. The efficiency with lead coils can be bettered by increasing their length.

The writer recently saw a tinning operation in a sheet mill where the steel sheet was first covered with an acid flux and then molten tin was poured over it. The excess tin dripped back into the melting pot so that the bath in turn accumulated considerable acid. However, the pot was successfully heated with gas fired immersion elements of cast iron.



A gas immersion heated melting unit recently fabricated for the Goodyear Tire & Rubber Co. With a capacity of 60 tons of lead the unit has an output of 30 tons of molten metal per hr. The connected load of 3800 cu. ft. of 1050 B.t.u. gas per hr. is purposefully larger than the actual needs during full production to allow for the intermittent casting periods.



E. J. W. RAGSDALE

Engineering for

Production in

Stainless Steel*

By E. J. W. RAGSDALE

Chief Engineer, Railway Division
Edward G. Budd Mfg. Co.

In extremely light-weight construction, 18-8 stainless steel must be used in very thin gages. To make strong structural members out of thin steel is one problem; to fabricate and assemble these into an equally strong structure is another. The metal must be especially engineered for the structure and the structure then engineered for production.

So far, such work has not yet been thoroughly done for aviation, but the principles of design and production which have been established in the building of stainless steel railroad cars are translatable into a much more refined form of light-weight construction.

In design engineering for 18-8 stainless steel only a very few basic values need be observed:

Lb. per Sq. In.

| | |
|-------------------------|--------------------|
| Tensile strength | 150,000 to 200,000 |
| Yield point | 120,000 to 180,000 |
| Shear strength of weld | 75,000 |
| Modulus of elasticity.. | 27,500,000 |

*Abstract of a paper presented at the National Aircraft Production meeting of the Society of Automotive Engineers at Los Angeles, Cal., Oct. 7 to 9.

No difficulty obtains in getting or working steel of such properties, but there is a decided difficulty in making such figures available for thin-walled structures. Some indication of this difficulty can be had from comparative stiffness factors. For instance, a flat sheet of duralumin is nine times stiffer than one of steel having the same size and weight. The answer is found in what has been termed the "flat-pitch ratio." This is the ratio between the flat width of any face of a column structure and its thickness. For instance, if a 2 in. square tube has a wall thickness of 0.05 in., the flat-pitch ratio is 2 divided by 0.05 or 40. Taking this ratio from the base line of chart No. 1, we find that the tube walls will buckle or otherwise become unstable when the stress in compression reaches 40 per cent of the tensile strength of the metal. If, however, a deep stiffening bead is rolled down the middle of each side of the tube, the flat-pitch is immediately reduced from 40 to 20 and wall instability will not manifest itself until the stress in com-

pression becomes 83 per cent of the tensile strength.

The chart refers only to short lengths and in addition to this, the usual column formulas are to be applied. It can be used for any system of flat surfaces of either closed or open section.

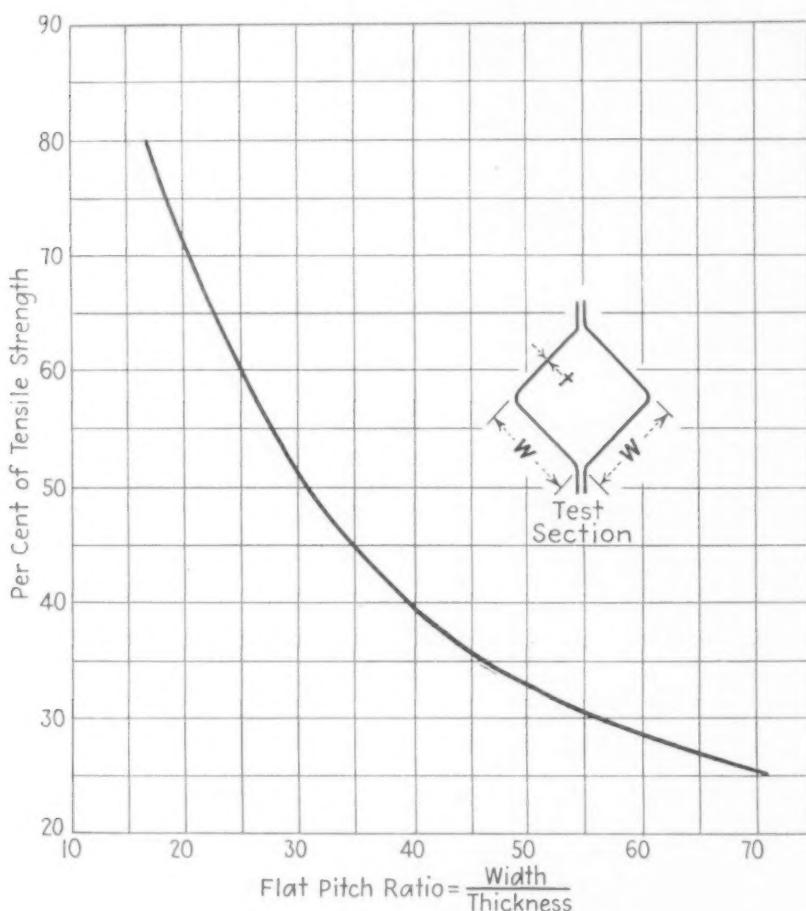
No mention is made of the stiffening effect of curvature. The reason for this is the problem of assembly. Flat surfaces favor an efficient joining, and furthermore, they can be narrowed or beaded so as to approach very closely the stability of a round tube. In designing for stainless steel, the structural members are designed about the joint rather than to have the joint designed to fit the members. So, we can regard the use of flat sided sections rather than round or curved ones, and the corresponding gusseted connections as the first step toward engineering for production.

The second step relates to the fabrication of such sections and their subsequent assembly. Both operations are obviously more com-

plex than those associated with aluminum construction or structures made up of gas welded steel tubing. But complexity need not be a handicap. When some forty welds can be made in the same time required ordinarily to drive one rivet, when these welds are more efficient than a rivet and yet cost nothing for material and when

new post not only cost one-third as much to fabricate, but it reduced the labor of final assembly and was actually a more effective load member.

Just how a reasonable cooperation between design and production can work out is illustrated by the relative reduction which has actually been effected in the man-hours



CURVE showing the effect of flat pitch on plate stability of thin-gage sections in compression. This chart refers to short lengths, and in addition the usual column formulas are to be applied.

the element of personal skill is eliminated, it will be appreciated that complexity of structure can be more obvious than real.

It is generally true that a closed section is more efficient than an open one, but it costs more money to fabricate it.

At first, the side posts of our railway cars were all made of U-shaped sections with a closing strip welded across the opening. Tests were then made of posts wherein the amount of metal used in the closing strip was added to the U-shaped section by making it of thicker gage. The opening was then stabilized with strips welded across it at 4 in. intervals. The

required to fabricate a pound of stainless steel as used in railway cars against the number of cars during whose construction this reduction has taken place. The man-hours have been reduced by 80 per cent during the construction of 60 cars—few of which were alike. Of course, improved tools and jigs were used during the period covered, but with no reproduction of identical units, the jigs had to be flexible and therefore not particularly efficient. When the product finally does become standardized, the economies which can be effected through proper tooling are well known.

The obvious intent of this paper

is to stimulate an interest in the use of stainless steel for aircraft structures and to show that the difficulty attending the use of a thinner metal has not been the limiting factor which it is often supposed to be. A far more potent factor is the human disposition to use or not to use any certain material or practice. Any radical departure from an established practice is more apt to come from the management and the argument inspiring such will normally follow commercial lines. The argument for stainless steel commercially is reduced to the following:

1. Stainless steel is already cheaper, pound for pound, than the lighter alloys.

2. Stainless steel comes ready for use. Neither its strength nor its corrosion resistance depends upon heat or other special treatments. It is usually supplied in coiled strips which can be readily formed into required lengths and thus reduce scrap loss. The forming is done through rolls, which is more of a production operation than is hand or power brake folding.

3. The normal corrosion resistance of stainless steel and the absence of ageing are accepted facts.

4. Stainless is susceptible to adequate assembly by welding. This may be automatic for sub-assemblies or a hand operation for a major assembly. In the "Shot-weld" process, the weld quality is automatically governed and any possible departure from the norm becomes a matter of record on a paper tape. Welding is efficient, cheap and rapid.

5. Availability. There are today a dozen mills supplying stainless steel and the competition between these has already resulted in price and quality improvements.

Still another argument favoring higher availability of material lies in the fact that the tools, equipment and designs made for stainless steel are also available for use with any other alloys of steel. There is a rapidly increasing number of these, mostly of the manganese or copper-chromium varieties.

The author believes that the experiences gained in the use of stainless steel for railroad cars and naval purposes can be projected into the fabrication of air-

craft, just as were those experiences gained in the initial aviation research extended into the other fields. These experiences have lately been concerned with production and, by the same token, that is exactly where research for aircraft application should commence.

It can be accepted as a basic fact that machine welding costs very little and that hand-welding of assemblies is much cheaper than any possible riveting. Equally basic will be the fact that thin steel requires more frequent attachment than the lighter alloys, from which two statements the logical conclusion is that all very frequent attachments should be machine-welded while final assemblies should be reduced to a minimum.

The outstanding feature of any aircraft structure is surface. The more surfaces can be organized into loadcarrying members, the less need be the extent of the skeleton structure. We then return to the old question of plate stability and recall that wood is 22 times stiffer than aluminum and that aluminum is 9 times stiffer than steel, pound for pound.

Therefore, the steel design naturally takes the form of corrugations. But, undulated skin surfaces are not consistent with speeds of 200 miles an hour or more, so the next logical step seems to be a corrugated sub-skin with a smooth outer sheathing attached to it. The work can be cheaply and effectively done with stainless steel and the automatic application of the "Shotweld" process. In this way, the stiffness ratio of aluminum to steel can actually be reversed. This means that the skeleton supports may be spaced as wide apart as other considerations may permit. It further shows that the fabricated sheathing has an almost illimitable capacity for carrying shear or compressive loads.

There will be found a wide variation of characteristics of fabricated sheathing, depending upon the gages of the flat and corrugated sheets, the depth and pitch of corrugations and weld spacing. A sheathing which is best suited to compressive loads will not be equally efficient in shear or tension. Nor is any skin dressing apt to fall entirely within the one category of loading. It therefore becomes necessary to establish through re-

search a number of standardized sheathings.

Next in order is the creation of a limited number of structural sections, from which skeleton structures may be assembled. With sheathing and skeleton structure once determined, the final problem lies in a proper attachment of these, one to the other. Again it is the connections and incidental fixtures which shape the design and not the primary stresses. These need only be designed into sections which are susceptible to good welding practice.

All of these suggested fundamentals depend upon welding. Resistance welding depends upon there being a resistance offered to the welding current. The lowest electric resistance is that of silver. Aluminum has twice as much. Eighteen-and-eight stainless steel, however, is 50 times as resistant as

silver, 25 times more resistant than aluminum and 8 times as much as mild steel. The immediate result of which is that 18-8 can be welded with small and portable welding machines. A 10-kva. welder will be sufficient for 90 per cent of all aircraft work. Aluminum spot welding, on the other hand, begins with a 100-kva. machine and may require even 500-kva.

The recorder used in the Shotweld system is considered a most essential element of that system. The little paper tape showing the record of every weld made is a comfortably reassuring bit of evidence. Weld strength and the welding pattern are taken from the drawing. The first operation is to make test welds with the actual production set-up. Then when a weld of required strength results, the recorder is adjusted to "normal" and the work may begin. A strength variation of plus or minus 5 per cent is reasonable and allows for permissible wear of electrodes, heating of cables and transformers and such incidental phases of commercial production.

Any condition permitting riveting will make for easy welding. On the other hand, good welding can be done under conditions where no rivet could ever be driven, let alone a hole drilled for it. Then, from the production angle, there is the two-point welding in which two pointed electrodes are used and the current is passed by a copper backing block held behind the sheets to be welded. The most productive of welding operations is roller welding. Here the work is progressed between rollers which serve at the same time as electrodes. The rate at which the rollers turn and the frequency of weld impulses permit anything from a continuous seam to a series of spots at whatever spacing may be desired. Any reasonable number of rolls may be used. One actual production job used five. The job was to weld a longitudinally corrugated strip to a flat sheet. These were progressed at four feet a minute and the welds were put in at a rate of 350 a minute.

Good production is the aim of engineering for production and even though the product may still be in the tailor-made class, as are aircraft and railway passenger cars, there should be a constant incentive to reduce operation after operation to a production basis.

Let's Consolidate Our Position!*

MACHINERY exporters have been favored by fortune during the past three years. We are in the lead. Now is the time to become firmly entrenched.

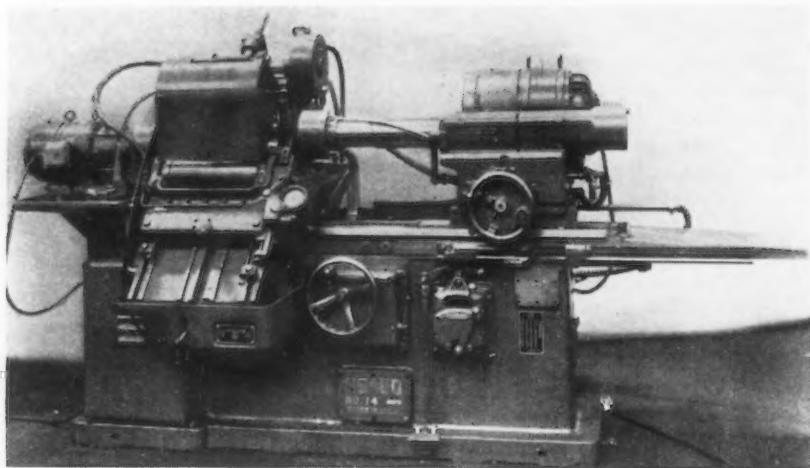
Five years ago England exported a little more than we did, and Germany twice as much. By a year ago last March England was far behind, and we exceeded Germany's foreign sales of machinery for the first time in years. This October our shipments were about \$8,000,000 in excess of Germany's \$25,000,000.

High quality and energetic selling did part of it. The preoccupation of our competitors with other urgent matters tended to make the victory easier than seemed possible five years ago. These countries temporarily even became some of our best customers.

Some day, perhaps more quickly than we expect, these other nations will again be free to compete more actively against us, and may decline markedly in importance as markets for us at the same time.

In anticipation of this revived competition, solidify our gains NOW. Travel, and get on personal friendly terms with foreign sales outlets, while export volume justifies the expense. Look to the other markets, and help them plan their industrial future. Establish engineering scholarships for promising young students of other countries. Get together and exchange helpful information with other American machinery exporters. Put the foreign sales program into gear for a long, fruitful, and pleasant trade period. It won't be regretted.

* From an editorial in *World Machinery News* for December.



Widens Range of Centerless Internal Grinders

FOllowing the successful application of the No. 81 high-speed centerless internal grinder of $\frac{1}{4}$ to 4-in. internal capacity and later the No. 73 machine of 4 to 8-in. size, the Heald Machine Co., Worcester, Mass., has brought out the No. 74 centerless for internal grinding of extra large cylinders and sleeves having bores from 5 to 24 in. diam. by 24

in. long and with maximum o.d. of 26 in.

The entire centerless unit is mounted on a rigid bridge bolted to the end of the bed. This bridge carries three rolls, a support roll, a drive roll and a pressure roll, all mounted on roller bearings. The support roll is carried by a bracket which is slidable on flat inclined ways on the front of the bridge,

whereas the drive roll is on horizontal ways at the rear. Both of these rolls are adjustable for different sizes of work by hand cranks, and both revolve in troughs filled with wool waste saturated with coolant. The waste continuously wipes the rolls clean of grit. The pressure roll is carried at the end of an arm attached to a shaft which is mounted in bearings at the top of the drive roll bracket and torque is applied to this shaft by a rotary hydraulic pressure unit. A large sheet metal guard ordinarily covers this mechanism.

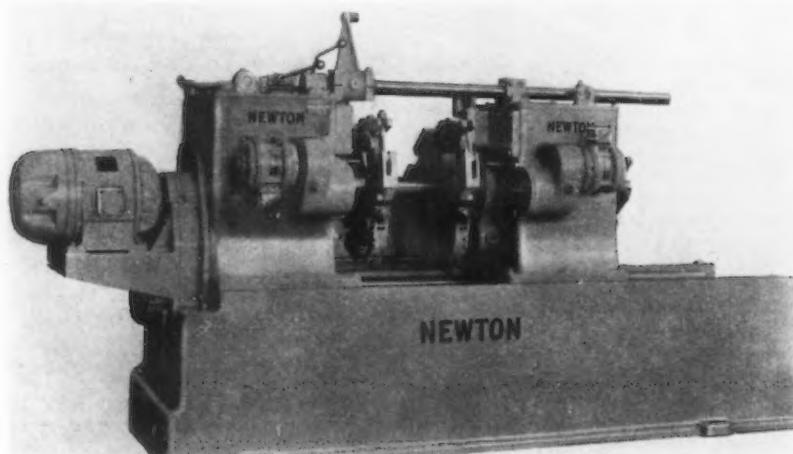
The drive roll is driven by V-belts from a motor mounted on the end of the bridge. Fast removal of stock with no distortion is assured by applying the grinding wheel directly opposite the point of work drive contact.

Other parts of the machine follow standard Heald design. Wheelhead is driven by V-belt and the table traverse is hydraulic, but a handwheel can be provided as shown in the photograph. All controls, including the hydraulic control lever for operating the pressure roll and push buttons for the work drive motor, are conveniently grouped at the front of the machine. A dial indicator is extra equipment, and a telltale light can be made to flash when the indicator finger approaches size desired.

Drum-Type Miller Combined With Center Drill

AMACHINE tool that combines the operations of face milling and center drilling both ends of shafts simultaneously has recently been built by the Newton division of Consolidated Machine Tool Corp., Rochester, N. Y.

By doing both these operations on one machine, production time and cost have been lowered considerably. This drum-type milling and center drilling machine, illustrated, uses a three-station universal fixture arranged to dwell against



index pins while drilling and loading.

Two milling spindles are mounted directly opposite, one in each head. One head is stationary and the other is adjustable along the base. Both heads are driven from one motor connected through suitable reduction gears.

Two drill spindles are also mounted directly opposite, one on each head. Each drill spindle has a separate motor connected through suitable reduction gears, including pick-off gears for changing the spindle speed. Drilling feed is obtained hydraulically and each drill spindle is mounted in a sleeve. There is provision for regulating the rate of feed and also the depth of drilling.

Each head contains a drum spindle for driving the work-holding fixture. This drum feed is also hydraulically operated, thus giving a wide range of adjustable feed rates.

Loading is performed at station No. 1 at the front of the machine; milling, at station No. 2; and center drilling, at station No. 3. After loading, the drills are withdrawn

at station 3, the index pins are released manually and the drum is started in rapid approach which automatically changes to feed while both ends of the shaft are being

milled at station 2. At the conclusion of the cut, the drum again rapidly traverses and stops against the index pins. The drills are then started into feed.

Offers Unit-Head Boring, Drilling And Milling Machines

FLOOR and planer types of horizontal boring, drilling and milling machines are being offered in a unit-head design by William Sellers & Co., Inc., Philadelphia. Featured is a unit head containing the driving motor, forward and reverse driving clutches, all speed and feed changes and hand and power traverse to the spindle head, and in the example of the table type, to the saddle and table as well. All shafts in the head are heat-treated alloy steel, multiple splined and revolving in anti-friction bearings. The spindle itself is nitrally and is mounted in "zero" precision Timken bearings, pre-loaded.

The floor type machine is supplied in two spindle sizes of 4 and 5 in. The main spindle on the 4-in. machine has 24 speeds ranging

from 8.8 to 505 r.p.m., and there is an auxiliary spindle with 14 speeds from 150 to 1500 r.p.m. On the 5-in. unit, the corresponding ranges are 5.8 to 334 r.p.m. and from 100 to 1000 r.p.m. There are 24 spindle feeds for both sizes and the head and column likewise have 24 feeds for each spindle speed.

The table type comes only with a 5-in. spindle and the speeds are identical with the 5-in. floor type. The saddle and table as well as the head have 24 feeds for each spindle speed. Table sizes range from 36 x 72 in. with 60-in. cross feed, to 60 x 120 in. with 108-in. cross feed. For this type there is an outboard upright bolted and doweled to a saddle on the bed, and it may be removed without disturbing the alignment of the outboard bearing with the spindle nor the gibs and

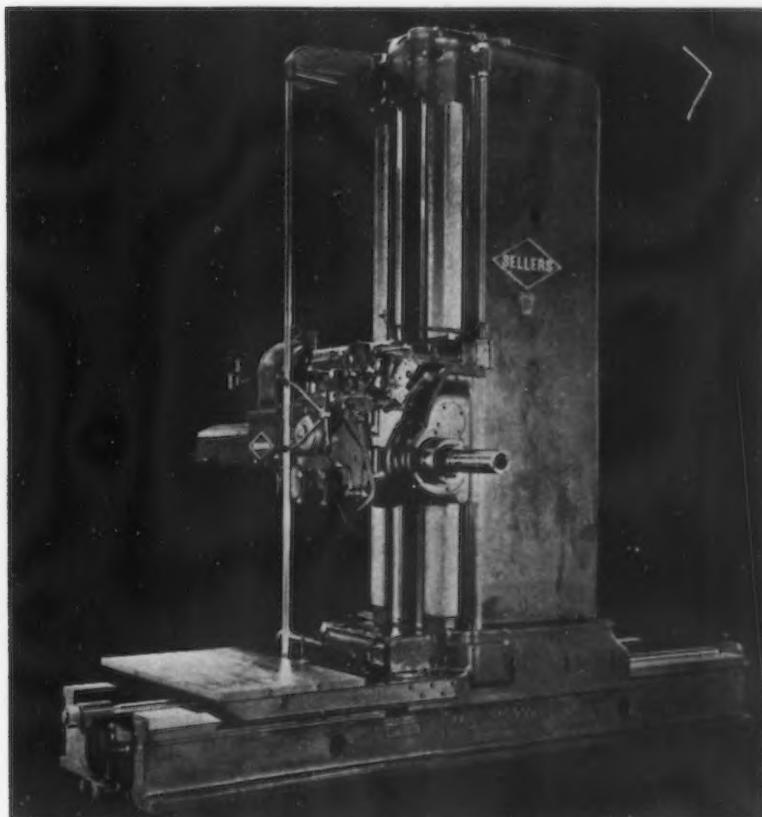
clamps on the saddle. In the case of the floor type, the upright of the outboard support is square locked and gibbed to its own runway.

The machines are controlled entirely from the unit head. Controls grouped there include a spindle start, stop and reverse lever, a feed and traverse lever, spindle speed selector and spindle direction lever. The directional controls of the head and saddle, however, are at the base of the column and the directional control of the table is on the saddle. For the floor type, the head and directional control levers are on the head.

Micrometer dials are provided on the front of the head for the spindle, on the base of the column for the head and saddle, and on either side of the saddle for the table. Both the head and table are equipped with scales and pointers for positioning as is the bed in the floor type machine. Pin gages and dial indicators as well as verniers can be furnished extra.

Instrument Measures Amplitude of Vibration

THE Vibrometer, an instrument for measuring the amplitude of vibration of structural or machine members, is announced by the American Instrument Co., 8036 Georgia Avenue, Silver Spring, Md. The range of the instrument is from 0.001 to 0.030 in. amplitude. It is held in the hand with the needle point against the vibrating



This unit-head floor type machine comes in 4 and 5-in. spindle sizes, with 24 spindle speeds and 24 feeds on head and column.



part whose amplitude is to be measured. The vibrating motion of the spindle is transmitted directly to the Vibrometer pointer which appears double to the eye of the observer. The apparent intersection of the two images, read on the scale on the background, gives the amplitude directly in thousandths of an inch.

The instrument is made heavy (2 lb.) to avoid inertia effects during use, and the construction is such that no damage can result when it is applied to a vibrating member the amplitude of which is greater than 0.030 in.

Current Metal Working Activity

Latest Data Assembled by THE IRON AGE from Recognized Sources.

| | November 1937 | October 1937 | November 1936 | Eleven Months 1936 | Eleven Months 1937 |
|---|------------------------|------------------------|------------------------|--------------------------|--------------------------|
| Steel Ingots: (gross tons) | | | | | |
| Monthly output ^a | 2,153,781 | 3,392,691 | 4,337,412 | 42,383,413 | 48,045,241 |
| Average weekly output ^a | 502,047 | 765,844 | 1,007,698 | 885,571 | 1,006,816 |
| Per cent of capacity ^a | 38.22 | 58.31 | 76.94 | 67.61 | 76.65 |
| Pig Iron: (gross tons) | | | | | |
| Monthly output ^b | 2,006,724 | 2,892,629 | 2,947,365 | 27,503,760 | 35,120,993 |
| Raw Materials: | | | | | |
| Coke output ^c (net tons) . . . . . | ..... | 4,262,946 | 4,288,392 | 41,708,432 | ..... |
| Lake Ore consumed ^d (gross tons) . . . . . | ..... | 4,203,873 | 4,269,049 | 40,087,983 | ..... |
| Castings: (net tons) | | | | | |
| Malleable, production ^e . . . . . | ..... | 42,953 | 50,934 | 510,022 | ..... |
| Malleable, orders ^e . . . . . | ..... | 34,810 | 58,152 | 509,299 | ..... |
| Steel, production ^e . . . . . | ..... | 65,957 | 68,874 | 722,076 | ..... |
| Steel, orders ^e . . . . . | ..... | 36,837 | 76,394 | 749,650 | ..... |
| Finished Steel: (net tons) | | | | | |
| Trackwork shipments ^f | 4,289 | 6,137 | 4,756 | 63,234 | 88,317 |
| Fabricated shape orders ^f . . . . . | ..... | 46,912 | 117,798 | 1,429,348 | ..... |
| Fabricated shape shipments ^f . . . . . | ..... | 149,308 | 128,306 | 1,413,352 | ..... |
| Fabricated plate orders ^f . . . . . | ..... | 31,942 | 40,519 | 433,019 | ..... |
| U. S. Steel Corp. shipments ^f | 587,241 | 792,310 | 882,643 | 9,757,767 | 12,336,397 |
| Ohio River Steel shipments ^f | 70,600 | 89,750 | 127,425 | 1,057,871 | 1,167,995 |
| Fabricated Products: | | | | | |
| Automobile production ^g . . . . . | ..... | 369,193 | 394,890 | 4,097,725 | ..... |
| Construction contracts ^g | \$198,465 [†] | \$202,081 [†] | \$208,081 [†] | \$2,475,600 [†] | \$2,703,672 [†] |
| Steel barrels shipped ^g . . . . . | ..... | 938,443 | 733,215 | 7,705,012 | ..... |
| Steel furniture shipments ^g . . . . . | ..... | \$1,918 [†] | \$1,646 [†] | \$17,133 [†] | |
| Steel boiler orders ^g (sq. ft.) . . . . . | ..... | 611,720 | 937,437 | 9,807,475 | ..... |
| Locomotives ordered ^g | 13 | 0 | 174 | 354 | 291 |
| Freight cars ordered ^g | 1,625 | 21 | 1,550 | 40,208 | 49,451 |
| Machine tool index ^h | 127.7 | 152.0 | 147.1 | 134.0 [†] | 163.5 [†] |
| Foundry equipment index ^m | 128.0 | 185.2 | 200.4 | 178.6 [†] | 181.8 [†] |
| Non-Ferrous Metals: (net tons) | | | | | |
| Lead shipments ⁱ . . . . . | ..... | 39,292 | 50,313 | 391,123 | ..... |
| Lead stocks ⁱ . . . . . | ..... | 100,646 | 176,960 | ..... | ..... |
| Zinc shipments ⁱ | 32,221 | 40,345 | 56,887 | 502,457 | 540,111 |
| Zinc stocks ⁱ | 42,984 | 25,817 | 57,527 | ..... | ..... |
| Tin deliveries ^p (gross tons) | 5,195 | 8,210 | 5,345 | 67,075 | 78,645 |
| Refined copper deliveries ^q | 37,025 | 48,440 | 75,409 | 729,931 | 843,105 |
| Refined copper stocks ^q | 221,676 | 182,911 | 171,291 | ..... | ..... |
| Exports: (gross tons) | | | | | |
| Total iron and steel ^r . . . . . | ..... | 522,611 | 203,297 | 2,709,853 | ..... |
| All rolled steel ^r . . . . . | ..... | 264,809 | 123,159 | 1,040,630 | ..... |
| Finished steel ^r . . . . . | ..... | 217,787 | 100,344 | 922,350 | ..... |
| Scrap ^r . . . . . | ..... | 184,547 | 69,113 | 1,773,836 | ..... |
| Imports: (gross tons) | | | | | |
| Total iron and steel ^r . . . . . | ..... | 37,186 | 61,970 | 614,245 | ..... |
| Pig iron ^r . . . . . | ..... | 11,870 | 10,615 | 155,486 | ..... |
| All rolled steel ^r . . . . . | ..... | 15,964 | 20,656 | 250,626 | ..... |
| British Production: (gross tons) | | | | | |
| Pig iron | 762,300 | 769,600 | 643,100 | 7,010,200 | 7,691,400 |
| Steel Ingots ^s | 1,178,300 | 1,133,600 | 1,001,300 | 10,679,800 | 11,860,200 |

[†]Three months' average. [‡]\$1,000 omitted.

Source of data: ^a American Iron and Steel Institute; ^b THE IRON AGE; ^c Bureau of Mines; ^d Lake Superior Iron Ore Association; ^e Bureau of the Census; ^f American Institute of Steel Construction; ^g United States Steel Corp.; ^h United States Engineer, Pittsburgh; ⁱ Preliminary figures from Automobile Manufacturers Association—Final figures from Bureau of the Census, U. S. and Canada; ^j F. W. Dodge Corp.—37 Eastern states; ^k Railway Age; ^l National Machine Tool Builders Association; ^m Foundry Equipment Manufacturers Association; ⁿ American Bureau of Metal Statistics; ^o American Zinc Institute, Inc.; ^p New York Commodities Exchange; ^q Copper Institute; ^r Department of Commerce; ^s British Iron and Steel Federation.

Per Cent

175

CAPITAL GOODS ACTIVITY

150

125

100

75

50

25

0

Per Cent

175

150

125

100

75

50

25

0

1933

1934

1935

1936

1937

THE IRON AGE Weekly Index of Capital Goods Activity

(1925-27 = 100)

| | | | |
|----------------------------|-------|----------------------|------|
| Week ended Dec. 18 | 60.1 | Same week 1934 | 56.0 |
| Preceding Week | 60.5 | Same week 1933 | 53.5 |
| Same week last month | 59.0 | Same week 1932 | 41.6 |
| Same week 1936 | 100.1 | Same week 1931 | 52.9 |
| Same week 1935 | 82.5 | Same week 1930 | 73.7 |
| Same week 1929 | 92.2 | | |

WITH the exception of the automobile series, only fractional changes from the previous week's levels were recorded by the various components of THE IRON AGE seasonally adjusted index of capital goods activity for the week ended Dec. 18. Down 0.4 points, the index now stands at 60.1 per cent of the 1925-27 base average. The week's automobile production, totaling 82,025 units, was 3738 units below the preceding week's total and the index dropped 2.0 points after adjustment to 68.6 per cent of the 1929 average. Automobile production in 1936 at this time amounted to 122,960 units. After 13 weeks of a steady downward movement, the Pittsburgh index reversed its trend and advanced 1.1 points, due chiefly to heavier rail ship-

ments of coal. The 13-week moving average of heavy construction awards continued to decline and forced the index number of this component down 0.4 points, despite a gain in the weekly dollar value of awards of 12 per cent over the previous week.

| | Latest Week | Change from Preceding Week |
|---|--------------|----------------------------|
| Steel production (per cent of capacity) | 27.5 | 0.0 |
| Automobile production (number of cars and trucks) | 82,025 | +3,738 |
| Railroad loadings of forest products (number of cars) | 26,908 | -1,113 |
| Pittsburgh industrial production and shipments (index number) | 58.3 | +1.1 |
| Construction contracts awarded (total value) | \$35,706,000 | +\$3,833,000 |

Components of The Index (1) Steel Ingot Production Rate, from THE IRON AGE; (2) Automobile Production, from Ward's Automotive Reports; (3) Revenue Freight Carloadings of Forest Products, from Association of American Railroads; (4) Industrial Productive Activity in Pittsburgh District from Bureau of Business Research of University of Pittsburgh; (5) Heavy Construction Contract Awards, from *Engineering News-Record*.

THIS WEEK ON THE ASSEMBLY LINE



... *William J. Cameron, Ford representative, criticises industry for its follies and political backwardness.*

... *UAW assistant president appointed to State Emergency Relief Commission by Governor Murphy.*

... *Auto production drops only slightly to 82,025 for U. S. and Canada.*

... *Master mechanic of automotive industry advises aircraft manufacturers to sublet stampings and use welded stainless steel construction.*

DETROIT, Dec. 20.—Instead of the soft-spoken, cheery-faced radio commentator he usually is, William J. Cameron of the Ford Motor Co. turned last week into a hard-hitting, outspoken critic. He aimed his blows not only where he might have been expected to, but to the surprise of 400 members of the Michigan Manufacturers' Association, he directed much of his comment at them, telling them they would not be saved from their own follies through "a drooling attitude toward Washington." The real enemies of America, he said, are the business men and statesmen who compromise on principles and ideals. Highlights of his address were:

Mark Hanna and the Republican party began the New Deal with the promise of a "full dinner pail."

"So-called business men" invented the NRA and "peddled it among prospective candidates for the presidency before the 1932 election."

"The biggest cloud on the horizon," Cameron asserted, "is the series of threats we read constantly and hear over the radio that this or that plant is going to be tied up. Or the whispering campaigns throughout the country trying to tear down the good name of some business. The wonder is why no protest is ever made against this ceaseless bombardment of ideas directed against business."

Michigan, he said, has been filled with aliens preaching obstruction. "They are met by a Governor who believes they are the advance guard of progress. Behind the Governor is a President who regards labor agitators as his storm troopers.

"I know one company that in the future will not respect the request of the President of the United States to compromise on a principle. We have the utmost respect for the office of President, but we will stand on principles."

Minimizes Business Recession

Cameron minimized the importance of the current business recession. Unlike the depression of 1929-34, it is not accompanied by financial uncertainty, distrust of banks or fear of a dictatorship, he said.

"We have discovered," he said, "that in this country we do not raise the type of men capable of dictating nor the type of people willing to be dictated to."

He rapped business men, particularly corporation executives "who are not deserving of the name business men, because they have not made business but have been made by business."

"Everything we have suffered through politics has originated with second-string business men. It was they who first peddled NRA to the Government. They were the original sinners, but they are largely in the discard now. You won't be saved by adopting a pathetic, fawning, drooling attitude toward Washington merely because they have stopped throwing bombs at American business and are content with throwing duds that do not explode. Don't forget that there are bombs there and they will explode."

The occasion was the annual dinner of the Manufacturers' Association, of which Edgar R. Ailes, secretary-treasurer of the Detroit Steel Products Co., was chosen president to succeed L. C. Upton.



BY
**WILLIAM F.
 SHERMAN**
*Detroit Editor
 THE IRON AGE*

the head of the Nineteen Hundred Corp., St. Joseph, Mich.

While appeals to Governor Murphy for additional welfare relief for the unemployed were being formulated by a newly formed labor union coordinating committee presided over by Richard T. Frankensteen, UAW assistant president, Murphy was preparing to announce the appointment of Frankensteen and William A. Neithercut, Flint attorney, to the Emergency Relief Commission. The appointment of Frankensteen brought strong protests like that voiced by one of Michigan's Republican representatives in Congress, Clare Hoffman, who charged Murphy with being "too friendly with those who led sit-down strikes in the automobile industry."

500 Arrests for Ford Disturbances

Though no one was ever jailed or even seriously hampered during last winter's sit-down wave, there are now on record nearly 500 arrests of UAW members who have been charged with minor indiscretions in heckling the Ford Motor Co. More than 200 were held by Dearborn police last Thursday afternoon for obstructing traffic on Miller Road outside the Ford gates to distribute their union literature. Sixty-one were arrested Dec. 8 for a similar offense. At Kansas City 161 persons were arrested for disturbing the peace Wednesday in an attempt at mass picketing of the Ford assembly plant there. Five days earlier, 49 were jailed, same place, same offense.

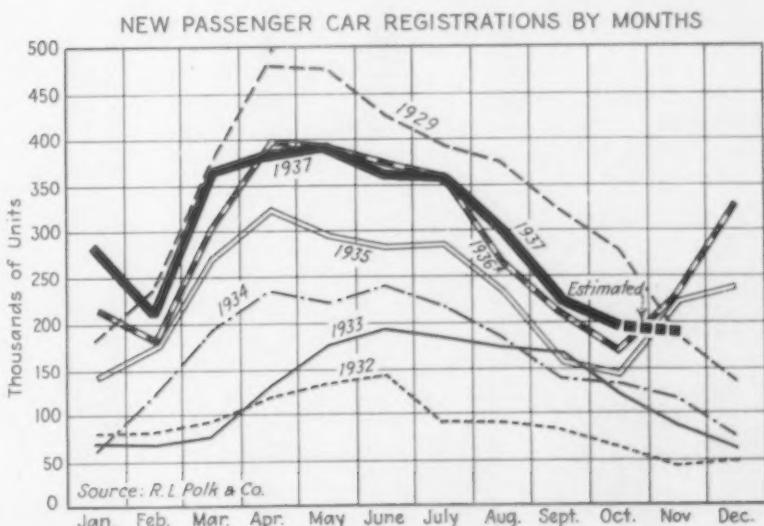
Half a million dollars is being spent by the UAW in the Ford unionization campaign, according to Frankensteen. Despite this, how-

ever, the union has been forced to abandon some of the activity at its Ford branch office on the west side of Detroit. When a bomb shattered windows and damaged the former bank building which served as the Ford union headquarters, it was learned that furniture and records had been removed several days earlier to the old Hoffman Building headquarters of the union. Apparently it signifies a retrenchment on the part of the union, although the building was still being used for storage of several thousand copies of the special edition of the UAW newspaper which was to be distributed at Ford's and 100,000 copies of the paper-bound "Flivver King" by Upton Sinclair, being sold by the union.

Since the UAW International was forced to end its financing of the UAW Medical Research Institute, the Detroit district council of

the UAW has taken up the work, hoping to raise money through contributions and a per capita tax on Wayne County and Detroit locals.

Newspaper coverage of the UAW has become extremely sketchy in recent weeks, not at all by accident. Like any business organization, the union has a publicity department for handling routine news contacts. A few months ago, Frank Winn, a former Texas newspaper man, who had the assignment for the UAW, was dismissed allegedly for being too partisan on the side of Wyndham Mortimer during the Milwaukee convention of the union. His successor, Lee E. Diamond, was just getting acquainted, not only with the newspaper men but with the union's officers and organizers, when he was replaced this week by a new man, John Tate, who, like any newcomer in an or-



INTER-DEPARTMENTAL CORRESPONDENCE

To Jim Sholund, Production Manager

From J. Fredericks, General Manager

Date 10/1/37

Subject:

Your report on New Equipment recently installed

and from the foregoing combined with your time analysis chart, it can readily be seen that this Bullard Multi-Au-Matic installation is already a Profitable move. I'm glad to know, too, that you feel that it is a key unit in regulating your production schedules.

You have conclusively proved the value of replacement with other Bullard Multi-Au-Matics, so I suggest that you now make out your formal request for such of these machines as you need; do it right away while the going is good.

It has become increasingly evident that possibilities afforded by the Multi-Au-Matic Method with Standard Tooling will be an important factor in future industrial activity.

As an instance: One concern uses this Method for quantities as low as 50 pieces. They make a time-saving more than sufficient to absorb change-over time from job to job. They lower operating cost and provide greater productive versatility.

Write today for details about The Multi-Au-Matic Method for small and medium quantity production.

THE BULLARD COMPANY
Bridgeport Connecticut



ganization, must learn the ropes and get acquainted.

Unconfirmed but well-authenticated reports are current in Detroit that wage decreases after the first of the year are contemplated by Detroit industries.

Automobile Production Steady

For another week automobile production holds nearly constant. Production of automobiles and trucks in the United States and Canada last week was 82,025, according to Ward's Automotive Reports, compared with an output of 85,763 the previous week and 122,960 for the corresponding week of a year ago. Chevrolet held to 20,000 units during the week. Plymouth dropped from 10,500 to 6800. Ford, with a little extra pressure, increased its production to 24,500 cars and trucks and also built 615 Lincoln Zephyrs. The company reports an increasing demand for the deluxe V-8.

A spot in the automotive picture that looks favorable is Willys at Toledo, which last week reached its peak so far on 1938 models, turning out 1026 units as contrasted with 845 the previous week. Truck production on its new line is making up a considerable portion of the output. The Federal Motor Truck Co. will start production this week on its 1938 models, after more than a month's delay attributed to die trouble. It is probable that the usual shutdown for inventory during the holiday week will be omitted. The company is completing an expansion and revamping of its sales department.

Export Sales Good

Among the best-looking sales reports in a long while is that of General Motors' overseas division for November, when the total was 29,338 units, representing an increase of 21.8 per cent over the volume of last November. Buying overseas was at an all-time high volume for the first 11 months of 1937. Sales of 334,438 represented an increase of 13½ per cent over the volume in the first 11 months last year.

Proposals have been submitted for machinery to build a new truck engine at the General Motors truck plant, Pontiac. It is understood that the new power plant will replace the Pontiac engines now purchased for truck use, making the GM truck line "go all the way" to overhead-valve engines. It has also been learned that definite steps are being taken to get machinery and tooling for two new passenger car engines in the General Motors line. Because Chevrolet has a relatively new design, it is not considered likely that this unit will be affected.

Chrysler will soon be making plans to tool up for two or three new engine models.

Suggestions for Aircraft Builders

Tooling problems for the manufacture of private aircraft were subjected to the critical analysis of one of Detroit's automotive experts, Carl J. Snyder, master mechanic of Dodge truck and Dodge forge plants. Snyder has had a more than passing interest in the use of stainless steel for the manufacture of aircraft for several years and on his own initiative has done a lot of work in that direction. Speaking at a Detroit session of the Society of Automotive Engineers last Monday, he assailed the aircraft manufacturers who try to sell the public 35 to 40 hp. light planes at \$1,500 to \$2,000 when the public is accustomed to buying 85 hp. cars for much less than \$1,000.

"I do believe the industry should deviate from the well-known path of custom and look into modern methods of production," Snyder told the engineers. "I have read of the drop hammer being used for making airplane stampings. This machine tool is very poor and was never intended as a stamping press. It isn't necessary to put in a press plant for making stampings. You can have them made in any of our many press plants which specialize on this type of work and get it

done cheaper than you can do it yourself."

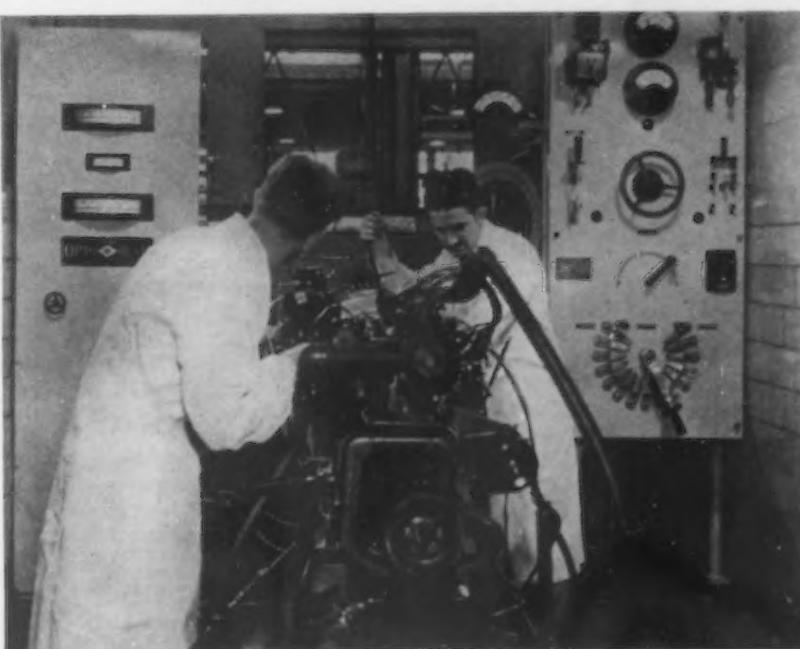
He also criticized the attempts of aircraft companies to assemble aluminum alloy parts by resistance welding because the plastic range of the aluminum alloys is so low and the welding capacity required is too high.

He advocated the use of stainless steel, which he said is not only readily worked in dies or rolls, but is admirably suited for assembly by industry's lowest cost medium, namely, resistance welding.

He told of the work already done in fabricating aircraft structures of this sort and recommended specifically that aircraft designing should be done in conjunction with specialists who understand tooling and costs; with stampings ordered in a press shop in quantities that are most economical to run. Store these stampings and start assembly only on receipt of order, he suggested, and exchange ideas on production with other aircraft builders. He pointed out that the aircraft industry as yet has no yearly models to put out, so it can amortize tool costs within a longer period than automobile manufacturers.

It was revealed at the session that the newest model auto-giro will have welded stainless steel rotor blades.

THE new type dynamometer room recently installed by the Chrysler Division, Chrysler Corp., includes in addition to the usual tests, the Opto-Beam, a device that gives a vacuum reading and exhaust gas analysis that infallibly records any error in adjustment or carburetion. The instrument panel is shown at the left rear. No engine can be passed until the readings of these instruments show that it is in perfect adjustment. The room in which this machine is installed is finished in tiles and the instrument panels are painted in bright colors, so that the effect is that of a modern kitchen.





WASHINGTON.

... *Wages and hours bill shelved by house on 216 to 198 vote following coalition of measure's foes in both parties.*

... *Freight rate increase decision, meeting little opposition from shippers, now expected to come in March or April.*

... *Maritime Commission calls for bids on 12 single-screw cargo vessels, taking 55,300 tons of steel, by Feb. 1.*

By L. W. MOFFETT

Resident Washington Editor
The Iron Age

• • •

servers saw the business recession making many House members cautious of such reform legislation.

Farm Bill Passes

Meanwhile the Senate, by a vote of 59 to 29, sent the often amended farm bill, considered the most drastic and far-reaching farm relief measure ever to pass either Senate or House, to conference between the two legislative bodies where many of the bills' compulsory features are expected to be modified. Since many House members apparently voted for the farm bill last week in the expectation that the Wages and Hours bill would pass and would thus maintain a balance between industrial wages and farm income, recommitment of the labor measure now threatens support of the farm bill conference report in the House.

Showing the tenseness felt on Capitol Hill by both sides during the controversy over the wage and hours measure, Representative Rayburn (Democrat of Texas), the majority leader, declared: "A vote this evening for the motion to recommit this bill is a vote for the death of wage and hour legislation."

However Representative Pettingill (Democrat of Indiana), warned "This (the wage and hours) bill will be the death sen-

tence of all intrastate business and the death sentence of the Democratic party, if enacted."

Incredible Muddle

During the course of the attack on the labor legislation, Representative Eaton (Republican of New Jersey), expressed the way taxpayers generally feel about high Government costs and meddling in business.

"I am profoundly depressed by the incredible muddle we find ourselves in as the days go by," said Eaton. "We have just passed a farm bill to raise the cost of food to the industrial worker in the city. We are now engaged in passing a wages and hour bill to raise the cost of the industrial workers products to the farmer, and the only new thing about it will be a vast new army of bureaucratic maggots who will be engaged in eating up the rest of the meat."

Pap also is feed to thousands of farmers who are put on the Federal payroll as crop control agents in order to see that hundreds of thousands of fellow-subsidized farmers do not chisel as participants in the program of planned scarcity.

Senator Writes Poem

This practice inspired a ditty from Senator Frazier, progressive

WASHINGTON, Dec. 21.—The controversial Wages and Hours bill, one of the four major objectives for which President Roosevelt called Congress into special session, has been shelved for this session at least by a House vote of 216 to 198.

William Green's AFL played a part in the vote which saw Republicans and conservative Southern Democrats combine to commit the measure to the Labor Committee despite a battle by its supporters for passage at this session.

By "pickling" the wage and hour control legislation in the committee, ostensibly for further study, the House took a step in which observers found as much political as economic significance. During conferences and debate prior to shelving of the legislation, which had been drastically changed by numerous exemptions obtained by individual members, Washington ob-

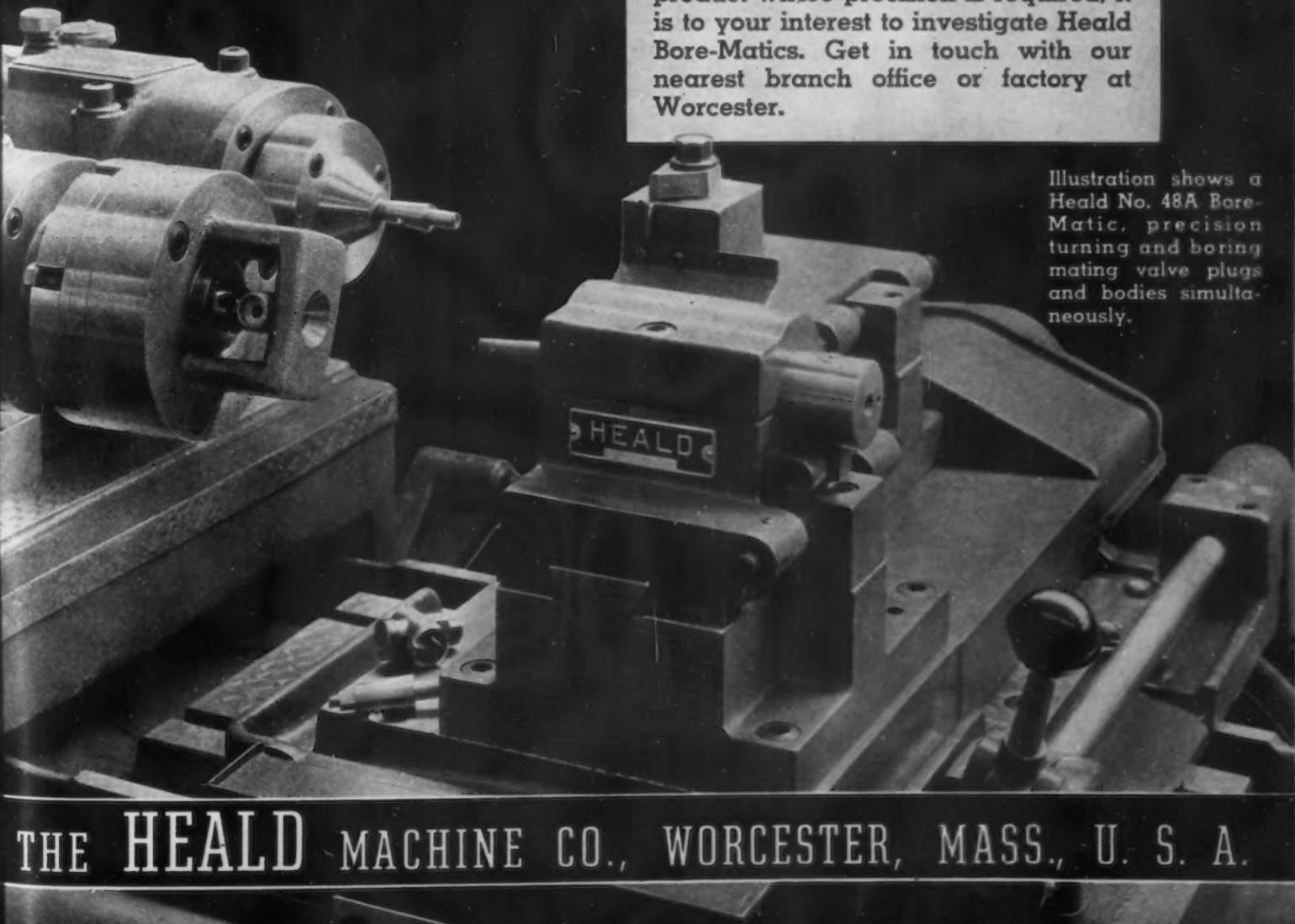
GET A BETTER PRODUCT AT LESS COST

on Heald Bore-Matics

GREATER ACCURACY
BETTER FINISH
MORE PRODUCTION
LOWER COSTS

SCRAP AND
SLOW, COSTLY
OPERATIONS

GET
ELIMINATE



PROGRESSIVE plants, including the largest of valve manufacturers, have eliminated slow, costly reaming and lapping operations at one stroke by installing Heald Bore-Matics for precision finishing, using single point diamond or tungsten carbide tools.

Results have definitely proven that these machines can finish such work at considerably lower costs with negligible tool upkeep, greater production and to higher standards of quality than can be produced by any other methods.

Whether you make valves or any other product where precision is required, it is to your interest to investigate Heald Bore-Matics. Get in touch with our nearest branch office or factory at Worcester.

Illustration shows a Heald No. 48A Bore-Matic, precision turning and boring mating valve plugs and bodies simultaneously.

THE HEALD MACHINE CO., WORCESTER, MASS., U. S. A.

Republican of North Dakota. The Senator, although strongly for the farmer, was kicking holes in the Senate farm bill, and was joking about the trips of a sub-committee of the Senate Agricultural Committee, which held "hearings" over the country, at which farmers were witnesses. Senator Frazier specifically referred to hearings at Sioux City, Iowa.

He broke forth with the following parody on Tennyson's "The Charge of the Light Brigade":

"Half a league, half a league,
Half a league onward
Into Sioux City rode
The crop-control six hundred;
County agents to right of them,
Payrollers to left of them,
Brain trusters back of them,
Volleyed and thundered.
Someone had blundered!
Theirs not to make reply;
Theirs not to reason why;
Theirs just to testify.
So into the valley of death,
Into the shadow of hell,
Ready to sell their soul

For compulsory crop control,
Valiant six hundred;
No, not because they felt that
way;
But just to get four bucks a
day."

Australia Eases Limits On Imports

WASHINGTON, Dec. 21.—Having previously removed import license restrictions on products including iron and steel and machinery items, the Australian Minister of Trade and Customs announced that licenses now will be granted freely for importation of goods not competitive with Australian industry, regardless of country of origin.

Among such articles are plain iron and steel plates, iron and steel wire of No. 15 or finer Imperial standard gage, tinned iron and steel plates and sheets, electric light and power cable, roller bearings and ball bearings, chucks for metal working machinery, printing machines and presses except rotary web and web printing machines weighing 25 tons or less, certain diesel or heavy oil engines, electric storage battery locomotives and parts, stitching machines, button hole punching and sewing machines, darning machines, typewriters, motorcycles and motorcycle frames whether partly or wholly finished, guns and rifles, files and rasps, and straw envelope making machines.

NLRB Orders Back Pay for 14 Workers

WASHINGTON, Dec. 21.—The Federal Bearing Co., Inc., and its affiliate, the Schatz Mfg. Co., of Poughkeepsie, N. Y., has been directed by the NLRB to reinstate with back pay 14 employees. The Labor Board charged that the discharged workers had been discriminated against because of union activities.

Warren McArthur Co. Buys Bantam Plant

WARREN McARTHUR CORP., Rome, N. Y., manufacturer of aluminum furniture, has purchased a two-story plant at Bantam, Conn., formerly occupied by the Bantam Ball Bearing Co. The new owners are remodeling the building and adding loading platforms.

Specify
**A.W. ROLLED STEEL
FLOOR PLATE**
for Safety!

"A. W." Standard Diamond Pattern

"A. W." Diamondette Pattern

The three patterns are here shown half size.

ALAN WOOD STEEL CO.
CONSHOHOCKEN, PA.

Branches: Philadelphia, New York, Boston, Detroit, Los Angeles, San Francisco, Seattle, Houston

111 YEARS' IRON AND STEEL MAKING EXPERIENCE

Safety for Busy Workers
is the principal result you gain from any "A.W." Rolled Steel Floor Plate pattern you install. But here are others:
You gain a PERMANENT installation at amazingly low first cost—and you eliminate all upkeep cost. Installation is quick, and need not interfere with men or production. Cut to any required shape and easily matched. As readily applicable to new construction as to replacement or repair work. A sanitary flooring which drains quickly—which is heat proof, crack proof, oil proof.
Write for newly revised literature—just issued—showing five "A.W." Floor Plate patterns to meet all needs, and giving complete engineering data.

March or April Best Guess For ICC Rail Rate Decision

WASHINGTON, Dec. 21.—Predictions regarding the time of the ICC decision in the 15 per cent freight rate advance case can have little weight but the best bet is that the decision will be handed down in March or April.

The case is being expedited though the ICC traditionally is declining to be rushed off its feet. But a decision one or two months after the final hearings begin (Jan. 17) in a case of such magnitude would be unprecedented. It was exactly one year after the railroads filed their petition that the ICC announced its decision of Oct. 22 in the former general rate increase case.

Of course, it is realized that the financial plight of the railroads is most pressing and the ICC evidently has this in mind in stepping up the case with a view to rendering an early decision.

Would Yield \$517,000,000

The increase by the October decision, estimated at \$47,500,000 a year, is wholly inadequate and for this reason the present request for a general 15 per cent advance in freight rates, to yield \$517,000,000 a year, was made. Even this will not balance increased costs carriers face in higher prices for materials, wage boosts and additional taxes.

Based on 1933 increases under these items the railroads claim annual operating expenses have risen \$664,000,000 and point out that yields from the increased rates, if translated into net income, are subject to the corporate tax which can range as high as 15 per cent. Moreover, bituminous coal prices have been increased. Railroads estimate that this will knock \$20,000,000 annually off of their income.

ICC Delay Approved

However, pressing as the railroad problem is, there is widespread approval of the ICC action in declining to be rushed unduly to a decision and agreement of President Roosevelt that the sooner the decision the better, provided the case is given reasonable consideration.

The country today is suffering from an excessive dose of slapdash performance. Ill-prepared, unconsidered legislation, orders, and

statements, issuing in rapid-fire, have left the nation dizzy and groping. Revision of much that has been done will be necessary so that orderly procedure may be followed. One difficulty has been that where there could have been orderly procedure for drastic

modification or repeal, a snail-like course to rectify or to partially rectify the blunder is being followed. Example: The intolerable undistributed profits and capital gains taxes, two highly important business depressants.

Hasty Action Opposed

Business and industry have with adequate reason opposed—in vain, unfortunately—hasty Washington action on many things. It should not complain of so-called ICC delay in rendering its decision. For



Greetings!

Christmas gives us occasion to express our appreciation of countless friendships—and many opportunities to serve. May it be a Merry Christmas to all! And may the New Year bring you Peace, Health and Happiness!

THE J.B.FORD CO. WYANDOTTE MICHIGAN



it is not delay. Nor should they want to see the ICC high-pressed into a precipitate decision. Else why complain about bureaucracy, executive domination, one-man Government, etc.? Chairman Jesse H. Jones of the Reconstruction Finance Corp. said last week that the RFC stands ready to make funds available for hard-pressed railroads until the ICC has taken steps to increase their revenues.

Regional Hearings

Already the ICC has completed its first hearing, held in Washington. Regional hearings now will follow. That the railroads have strong support in this case is evident from the relatively mild shipper opposition to rate increase. The only strong opposition at the Washington hearing was against

the proposed increased rates on coal and lumber.

While regional hearings will probably develop more opposition than appeared at the Washington proceedings, on the whole it is not expected to reach large proportions. Many important industries, including steel, have made no protest against the proposed increases, but on the contrary would like to see them applied at the earliest possible time within reason. Certainly the industries themselves will benefit when railroad purchasing power is increased.

President Ralph Budd of the Burlington railroad has estimated that if the rate increases are granted, the railroads will come at once into the market for \$900,000,000 worth of equipment and supplies annually for several years.

LANDMATIC Die Heads Reduce Threading Costs

A typical example of the cost reduction which invariably follows the installation of LANDMATIC Heads is seen in the results that are obtained by the Clayton Manufacturing Company, Alhambra, Calif.

A 2" LANDMATIC Die Head reduced threading cost 25% over previous methods, cutting a 1 3/4" diameter—16 pitch thread, 4 1/2" long on Packing Boxes.

The Accuracy and Economy of LANDMATIC Die Heads assured reduced cost. May we prove their efficiency on your threading operations? Write us today.



58—THE IRON AGE, December 23, 1937

Population Gains Faster Than Steel

STEEL ingot-producing capacity equals 1204 lb. per capita, lowest since 1929, calculations of the American Iron and Steel Institute disclose. During the past eight years population in the United States has increased more than steel capacity.

In 1929 the steel industry had aggregate capacity of 63,067,500 gross tons of ingots per year, equivalent to 1162 lb. of ingots a person. During the first half of that year the industry actually operated at 96 per cent of that capacity.

Operations at that high level indicated to many steel companies the need of additional equipment, the construction of which was carried over a period of several years. Peak of steel capacity per capita came in 1933 when the industry had equipment for producing annually 1236 lb. of ingots per capita. Since that year the capacity per capita has dropped 2.5 per cent, while output per capita has almost doubled.

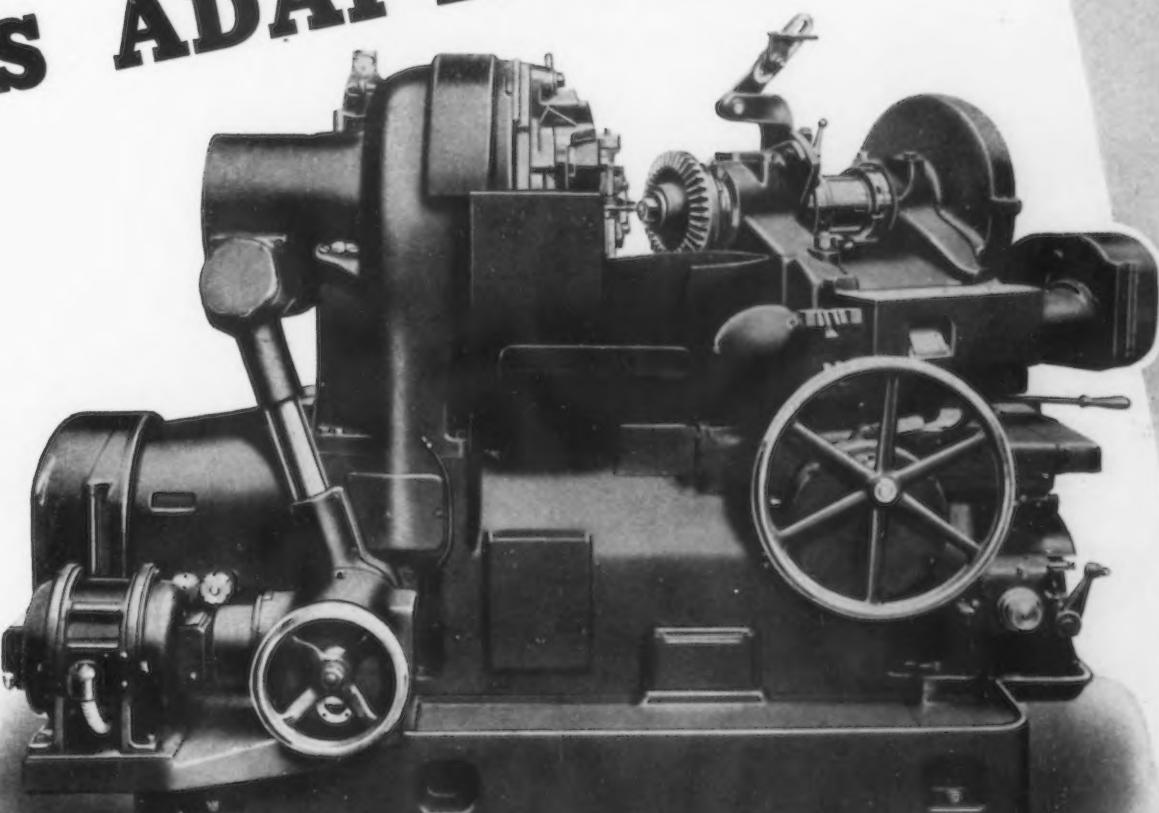
At the first of this year the industry had aggregate capacity for producing 1208 lb. of steel ingots per capita per year. Although during the first half of the year the aggregate capacity was increased 300,000 tons to 69,534,200 gross tons per year as of July 1, the increase failed to keep pace with the rise in population resulting in a decline of 4 lb. in the annual capacity per capita.

Hanson-Van Winkle-Munning Enlarges Plant and Office

HANSON-VANWINKLE-MUNNING CO., manufacturer of electroplating equipment and supplies, Matawan, N. J., has built a new office building on Church Street, Matawan. The additional space (approximately 2000 sq. ft., making a total of 10,000 sq. ft. of office space in all) is used as a drafting and engineering room. The second extension within two years has been added to the electrical shop. The building recently constructed is 54 x 72 ft., which, with the first extension of 38 x 54 ft. adds a total of about 6000 sq. ft. of additional space.

A new railroad spur has been built with sunken tracks so that the car floor is on a level with the new concrete loading platform. A 60-ton crane has been erected for loading and unloading heavy equipment. A new electrical substation has been installed to take care of the additional load.

Accepted FOR ITS ADAPTABILITY



12" Straight Bevel Gear Generator

ADAPTABILITY is the essential feature of this machine. Simplicity of operation and speed in setup make it the ideal machine for both job shops and production plants, a machine for cutting 10 or 10,000 Straight Bevel Gears. Capacity: 24" pitch diameter . . . 10 to 1 ratio . . . 3 diametral pitch . . . 3 $\frac{1}{2}$ " face.

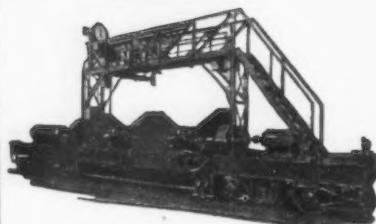


GLEASON WORKS

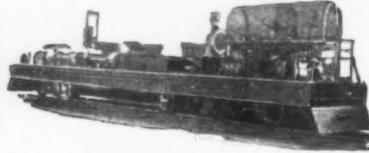
Builders of Bevel Gear Machinery for Over Seventy Years

1000 UNIVERSITY AVENUE, ROCHESTER, N. Y., U. S. A.

ATLAS CARS



Double Compartment Scale Car with Overhead Operator's Platform. Car provided with Orr Bin Gate Operating Mechanism.



20 Ton Capacity Double Compartment Scale Car for use with Orr type Bin Gates controlled from Operator's Station on Scale Car.

Atlas Products

Gas Electric and
Diesel-Electric Locomotives
Electric Transfer Cars
for Blast Furnaces and Steel Plants
Stockhouse Scale Cars
for Blast Furnaces
Concentrate and Calcine Cars
for Copper Refineries
Automatic and Remote Controlled
Electric Cars
Pushers, Levellers and
Door Extractors
Coal Charging Lorries,
Coke Guides and Clay Carriers
Atlas Patented Coke Quenching
Cars for By-Product Coke Ovens
Atlas Patented Indicating and
Recording Scales
Special Cars and Electrically
Operated Cars for every
conceivable purpose.

THE ATLAS CAR & MFG. CO.
Engineers - Manufacturers
1140 Ivanhoe Rd., Cleveland, O.

U. S. Asks Bids On 12 Ships Taking 55,300 Tons Of Steel

WASHINGTON, Dec. 21.—The Maritime Commission, last week, called for bids on construction of 12 fast single-screw steel cargo vessels for operation in foreign commerce. Bids are due in Washington on Feb. 1.

Officials of the commission described the step as "the largest individual peace-time order for merchant cargo tonnage ever placed in this country."

"Construction of the vessels will initiate an orderly replacement program to rehabilitate the country's aging merchant fleet of World War origin which will be virtually obsolete within the next five years," Joseph P. Kennedy, commission chairman, said.

Cost Above \$18,000,000

The design, known as the C-2, calls for a vessel 435 ft. long, 63 ft. wide with a load draft of 25% ft., a displacement of 13,900 tons, a dead weight of 9291 tons, and a cruising radius of 13,000 miles. The 12 ships will require about 55,300 tons of steel. Unofficial estimates placed the cost at \$18,000,000 to \$23,000,000.

Mr. Kennedy said the program marks the first time in 15 years that a sea-going ship of the general cargo type has been built for foreign trade in an American shipyard. He described cargo ships as "urgently needed" because "the highest degree of obsolescence prevails among vessels of this type."

Estimates on a Fixed Sum Basis

Not more than four vessels will be awarded to the same contractor, according to the commission's announcement. Vessels must be completed within 420 calendar days, including Sundays and holidays, although an additional margin of 60 days will be allowed for completion where the contractor is building more than one of the ships. The commission said that bids fixing the shortest time for completion will be given preferential consideration.

Shipbuilders have been requested to estimate on a fixed sum basis and on an adjusted price basis, the latter providing for adjustment of contract price resulting from changes in labor and materials costs during the construction period if these variations do not swing more than 15 per cent either way. Bids submitted on an adjusted price basis must be accompanied

by bids computed on a fixed sum basis.

Four Steam, Four Diesel

The commission plans to have four of the 12 ships steam propelled and four Diesel powered. The type of engine for the other four will be decided upon after bids have been examined. Alternate machinery bids were requested.

Described as incorporating the latest improvements in construction and machinery arrangement, the C-2 design is the result of design improvement and modifications as developed from recommendations made by shipbuilders, operators, naval architects and commission experts. The standardized design is expected to expedite construction and effect substantial economies in building cost, according to the commission.

Before completion, the ships will be available for purchase by private steamship operators under the provisions of the Merchant Marine Act of 1936. In the event they are not purchased, the commission said they may be used for replacements on the Government-owned steamship lines.

Two Of Each Five American Steel Workers Above 40

Two out of every five steel workers are over 40 years old, the American Iron and Steel Institute found in data received from companies employing two-thirds of the industry's workers. Almost half of those above 40 are 50 or older, the Institute said.

Employees from 18 to 25 represent 20.2 per cent of the total and the group from 26 to 40 years comprises 39.8 per cent while the average age of all steel workers is 38 years, or two years more than the average age of steel workers in 1930. Workers in other manufacturing industries, the Federal Census of 1930 disclosed, averaged a little less than 35.

The increase in the average age since 1930 reflects not only improved public health conditions, but also the increasingly wider use of equipment lightening the toil required in the manufacture of steel. This has made possible employment of more older men.

This metal fabricating plant (name on request) uses 29 Westinghouse Ignitron Timers to cut costs and improve quality of resistance welds.

Westinghouse Ignitron Split-second Controls
REDUCE WELDING COSTS

With the precise regulation of timing and current provided by Westinghouse Ignitron Controls, you can definitely cut costs on all types of resistance welding. Increased output, higher quality welds, and lower maintenance costs, can be attained by simply adding Ignitron Controls to your present equipment—and by specifying "Ignitron Control" on new welders being purchased.

And to cut costs still further, consider Ignitron Timers for resistance welding on many products, metals and alloys for which more expensive fabricating methods are now being used. If you have a problem of cutting costs, speeding up production, or improving quality in resistance welding operations, investigate Westinghouse Ignitron Welding Controls. Write for complete information today.

J 20452

DO YOU USE
RESISTANCE WELDING

for

ALLOYS • ALUMINUM • BRASS
COPPER • NICKEL • STEEL
STAINLESS STEEL • TUNGSTEN
or combinations of these metals?
If so, it will, pay you to investigate
Ignitron Welding Controls. Write
today for booklet B. 2123. Westing-
house Electric & Manufacturing
Company, East Pittsburgh, Pa.



Westinghouse

Ignitron Control
for
RESISTANCE WELDING



..PERSONALS..

HARRY M. MOSES has been elected president of the H. C. Frick Coke Co. and the United States Coal & Coke Co., effective Jan. 1. He succeeds his father, THOMAS MOSES, who at that time will take up his duties as vice-president of the

United States Steel Corp. (Del.) in charge of raw materials. CHARLES L. ALBRIGHT, secretary, Frick Coke Co., has been made vice-president and secretary of the same concern and vice-president, United States Coal & Coke Co.

Thomas Moses has been president of the coal producing subsidiary of the steel corporation since 1927 and has been associated for more than 60 years with the bituminous coal industry. Harry Moses began his career in coal producing subsidiaries of the U. S.

ANOTHER WAY



to
reduce
overhead

—is to use a Radial which, without being oversize, bulky and cumbersome, can efficiently handle fairly big work.

Illustrated is a good example, and it represents substantial savings in first cost, direct labor, floor space, interest charges and depreciation. In short, MORE HOLES PER DOLLAR!

Write today for complete details

The Cincinnati Bickford Tool Co.
Oakley, Cincinnati, Ohio

CINCINNATI BICKFORD



H. M. MOSES

Steel, was an assistant mine foreman in 1919 and held various other supervisory positions until 1933 when he was made general superintendent of the Kentucky & West Virginia operations of the coal and coke company, which position he leaves the first of the year to take over his new duties.

Mr. Albright has served the coal producing subsidiaries in various capacities since entering business in 1905. He was appointed to his present position in 1935.

* * *

S. E. GRAEFF, for the past seven years assistant general superinten-



S. E. GRAEFF



C. E. WILSON

dent at the East works plant of the American Rolling Mill Co., Middletown, Ohio, has been named assistant general manager of Richard Thomas & Co., Ltd., England, with which Armeo is now associated. He will be in charge of all sheet production for the English company, which is building a new continuous mill under an Armco license for operation the middle of next year.

❖ ❖ ❖

CHARLES E. WILSON, vice-president in charge of General Electric's appliance and merchandise department since 1930, has been ap-



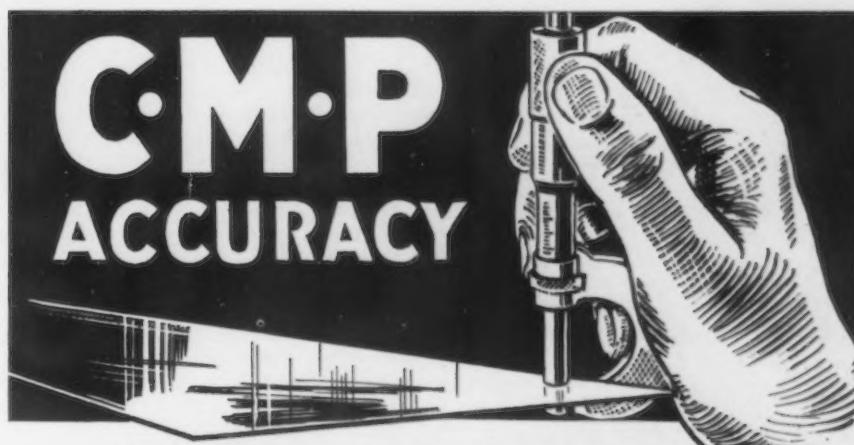
P. D. REED

pointed executive vice-president of the company, a newly-created position. He has been with the company and its predecessors since 1899. PHILIP D. REED, who became identified with the company in 1926, has been made assistant to the president. Since 1934 he has been general counsel of the lamp department.

❖ ❖ ❖

SAMUEL E. BOOL, one of the six partners of Pickands, Mather & Co., Cleveland, was honored Dec.

15 with a celebration of the 50th anniversary of his joining that firm. The entire staff of the organization gathered together to congratulate him, and HARRY G. DALTON, senior partner, made a brief speech. In the presentation speech by HOWARD DRAKE, auditor, Mr. Bool was given a bronze figure of a mare and colt, which was appropriate because of his known love of horses. Mr. Bool was the recipient of numerous congratulatory letters and telegrams from friends



COSTS NO MORE

● An important quality feature of Cold Rolled Precision Strip Steel is its close limits of gauge accuracy over the complete width and length of the strip. Many manufacturers have known for years that this steel is more accurate to gauge than standard trade specifications. Instead of specifying a special tolerance they use our regular output, get the quality they need and save money.

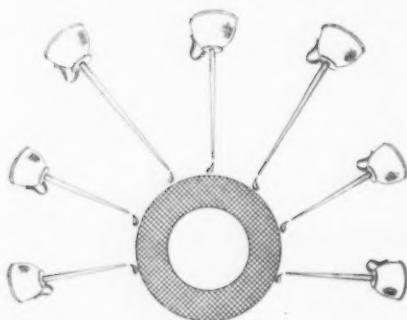
C.M.P. Accuracy stands for Cold Metal Process Accuracy. It indicates a higher grade of strip in carbon or stainless steels—available in any analysis and temper, in gauges as light as .001" and in the largest coils you can handle.

The Cold Metal Process Co.
Youngstown, Ohio



Cadman

BABBITT METALS



MAKE BETTER BEARINGS

An exclusive process of manufacture puts Cadman Bearing Metal in a class by itself. Cadman Metal has a superior self-lubricating structure, consisting of a network of antimony or antimonial compound in which lies a softer matrix.

As a result bearings made of Cadman Metal last longer and stand up under overloads and high temperatures. Even at 212 deg. F. Cadman Metals show a Brinell hardness of nearly twice that of ordinary babbitt.

A. W. CADMAN

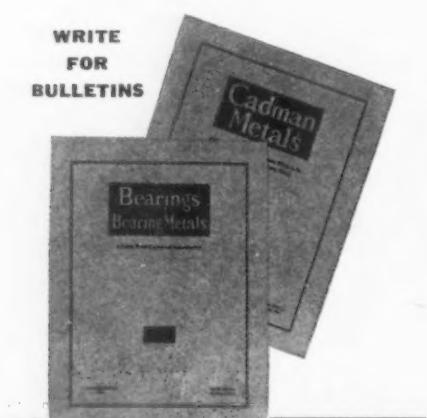
MANUFACTURING COMPANY

2813 SMALLMAN STREET

PITTSBURGH, PA.

Master Makers of Fine Bearing Metals
Since 1860

WRITE
FOR
BULLETINS



and business associates in many parts of the country.

❖ ❖ ❖

DR. FRANK J. TONE is to be presented with the Perkin medal of the Society of Chemical Industry at a joint meeting of the American section of the society and the American Chemical Society on Jan. 7 at the Chemists' Club, New York. The medal is awarded annually for the most valuable work in applied chemistry and is given to Doctor Tone for his work in the field of abrasives and refractories.

MAX SCHLOSSBERG, of M. S. Kaplan Co., Chicago, has been elected president of the Chicago chapter of the Institute of Scrap Iron and Steel.

❖ ❖ ❖

T. M. ROBIE has been appointed manager of the diesel sales division of Fairbanks, Morse & Co., Chicago. He has been associated with the company since he returned from World War service in 1919 and has served in numerous capacities in the manufacturing and sales division. Since 1932 he has been in charge of diesel sales to resale manufacturers. Previously he was employed at the factory on diesel engine designing, testing and building for nine years. He is a graduate of the University of Michigan.

❖ ❖ ❖

JOHN HOWE HALL, consultant in steel foundry practice, has changed his address from High Bridge, N. J., to 6802 Lincoln Drive, Germantown, Philadelphia.

❖ ❖ ❖

J. E. MACMAHON, formerly assistant sales manager of the Graton & Knight Co., Worcester, Mass., has been appointed general sales manager, succeeding C. O. DRAYTON, who resigned recently. Mr. MacMahon has had many years of experience with the company, including work in the factory, engineering department and as a salesman in the southern territory. In recent years, he has been employed in an executive capacity in the sales promotion and advertising departments, as well as in the sales department.

❖ ❖ ❖

PAUL H. HAMEL, who has been identified with the scrap business for the past 20 years, has assumed the management of the Friedman Brothers Scrap division of the Reliance Steel Corp., Cleveland.

❖ ❖ ❖

SANFORD A. MOSS, mechanical engineer in the Thomson research laboratory of the General Electric Co., West Lynn, Mass., and prominent in the development of centrifugal compressor and supercharger for aviation engines, will



T. M. ROBIE

retire on Jan. 1 after 34 years of service with the company. Doctor Moss entered the employ of the company in 1903 after receiving his Ph.D. from Cornell University.

❖ ❖ ❖

EDGAR R. AILES, secretary-treasurer of the Detroit Steel Products Co., has been chosen president of the Michigan Manufacturers' Association, succeeding L. C. UPTON, head of the Nineteen Hundred

(CONTINUED ON PAGE 81)



W. R. SPINDLER, who, as announced in these columns last week, has been made manager of exports of the Jones & Laughlin Steel Corp., with headquarters in New York.



Hundred Horsepower Hands!

• Only one pair of hands; but placed on the controls of a YALE Electric Truck—they match the power of a hundred horses!

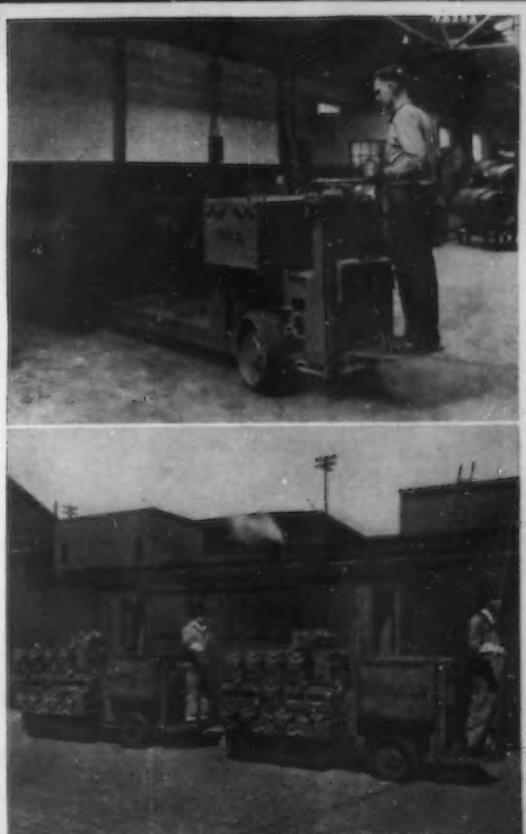
You can't wring profits from today's highly competitive markets with haphazard methods. It takes high-geared efficiency at low-geared cost to put the black ink in your ledgers...the kind of efficiency that a YALE Electric Truck-ning System throughout your plant will give!

Sturdy...Saving...Safe...YALE Electric Trucks are the busy bees of American industry. Step into almost any successful plant* and you'll find them economically going about their business of Lifting...Hauling...Stacking...Storing! Powerful profit makers—that's what they are!

Made in all sizes, types and capacities—there's a YALE Truck to fit your every need. Designed and built by YALE engineers to give lasting economical service, you'll find them the answer to your materials handling problems.

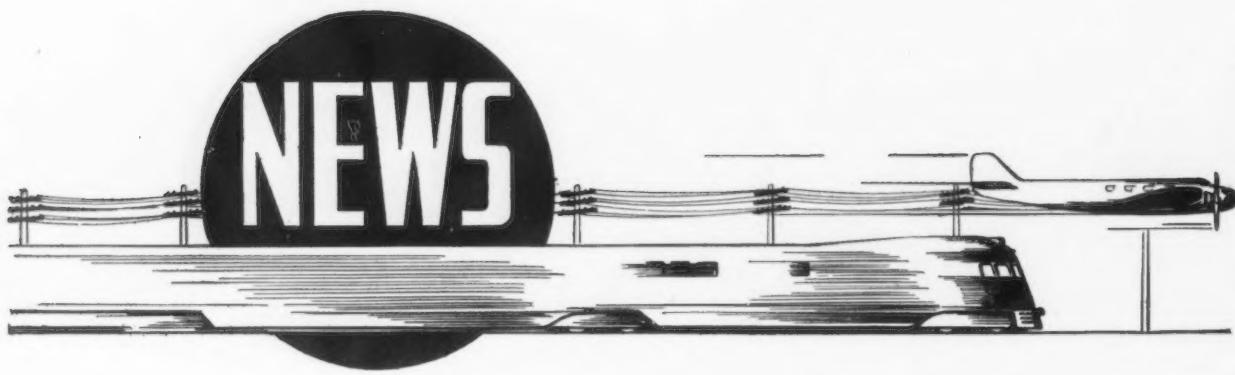
Let a YALE representative show you how you, too, can give your workmen Hundred Horsepower Hands.

* WE'LL BE GLAD TO SEND YOU NAMES OF INDUSTRIAL LEADERS EVERYWHERE WHO ARE SAVING TIME AND MONEY THE YALE TRUCK WAY



THE YALE & TOWNE MANUFACTURING COMPANY,
PHILADELPHIA DIVISION, PHILADELPHIA, PA.

IN CANADA: ST. CATHARINES, ONT.



Contract-Breaking Unions Die, Murray Tells SWOC Rally

ABOR unions which break their contracts with employers will not survive, Philip Murray, chairman of John L. Lewis' Steel Workers Organizing Committee, declared last week in a report to a national convention of SWOC union delegates at Pittsburgh.

The SWOC, a Committee for Industrial Organization affiliate, is a sister union of the United Automobile Workers Union which has been criticized for months for dozens of strikes held in violation of UAW agreements signed with automobile manufacturers.

"I cannot stress too strongly the importance of strict observance of contracts," Mr. Murray told the steel union delegates. "Observe

your contract and your union grows; violate it and your union dies."

Checkoff Not Mentioned

Industry, searching for clues to what if any additional union demands will be made in February, when Murray and other steel union leaders meet executives of some steel companies to negotiate the 1938 union contracts, found that Murray's report ignores the check-off. Likewise the SWOC leader avoided mention of the closed shop and disregarded appeals of a minority union group for a 6-hr. day, five-day week and \$6 minimum daily wage.

However, the union delegates indorsed a proposal that Congress

establish the 30-hr., five-day week by law. Seventy-one resolutions requested wage increases ranging from 5c. an hour to a flat 20 per cent while 34 resolutions of 837 presented from various lodges indorsed the 30-hr. week.

Apparently seeking to keep full power for uninstructed negotiations with steel manufacturers, Mr. Murray said in his report:

"I invite your views on the wage policy question, but recommend that the matter of negotiating a satisfactory wage agreement to succeed the one which will expire on Feb. 28, 1938, be left entirely in the hands of the executive officers and the scale committee."

Claims Impressive Record

"With negotiations for our new contracts next February successfully concluded, as we believe they will be," said the SWOC leader, "there should follow both on the part of the wage earners in the in-

NEWS AND MARKET INDEX

| | | | |
|------------------------|----|--------------------------------|-------|
| Personals | 62 | New York Market | 91 |
| Obituary | 72 | Philadelphia Market | 92 |
| Fabricated Steel | 76 | Non-ferrous Market | 93 |
| Steel Ingot Production | 82 | Scrap Market and Prices | 94-95 |
| Summary of the Week | 83 | Finish Iron & Steel | 96-97 |
| Pittsburgh Market | 84 | Warehouse Steel Prices | 98-99 |
| Comparison of Prices | 85 | Pig Iron & Raw Material Prices | 100 |
| Chicago Market | 87 | Machine Tool Activity | 102 |
| Cleveland Market | 89 | Plant Expansion & Equipment | 104 |

LARGER GEARS

by
Morgan



MORGAN
WORCESTER,
ENGINEERS AND
MANUFACTURERS

■ This unusual machining operation is another typical instance of Morgan pioneering. When development of the continuous rolling mill indicated the need for large spiral bevel gear drives, Morgan engineers designed and built machines to make the gears.

Pioneering tradition is strong in this company,

dating back to the development of continuous rolling mills by Morgan. This pioneering is based on sound engineering principles developed through years of cumulative experience.

Thorough planning of Morgan Mills to the smallest detail assures dependable and highly productive operation.

R32

MORGAN CONSTRUCTION CO. • WORCESTER, MASS., U.S.A.

THE IRON AGE, December 23, 1937—67

dustry and the management a general acceptance of the union as a permanent and constructive institution.

Warning union members of "contract difficulties" likely in February, the SWOC wage scale and policy committee said that the recession and unemployment must temper "the policies which your officers pursue." The committee said:

"We have enough information to know that the current depression probably will last longer than most

people suspect. The major outlets of steel are closed for at least six to eight months."

Seniority Watched

In a supplementary report to the convention, Clinton S. Golden, SWOC regional director in the Pittsburgh area, said "some companies have already indicated a desire to revise and renew their contracts with us although they do not expire for another three months."

Steps will be taken by the steel union "to see that seniority provi-

sions of contracts are complied with both in the reduction of working forces, and again when operations are resumed to see that all former employees are returned to their jobs before new employees are hired," Golden said.

Issue Financial Data

Apparently in an attempt to answer protests that the SWOC and other unions should make public their finances, the SWOC officials report included a financial section which told how the steel union dues dollar is distributed but furnished no figures as to total dues paid, expenses or salaries of high union officials. Of each \$1 paid in dues to the SWOC 25c. was returned to the union lodges, 11c. went for strike expense, 45c. for "salaries, expenses and reserve," 7c. for field offices expense, 3c. for lodge supplies and the remaining 9c. for publicity, rent, legal advice and other expenses, according to David J. McDonald, secretary-treasurer.

Salaries of field workers (213 on Nov. 15 compared with 257 when the steel organizing drive began in July, 1936) range from \$6 to \$10 while part time field workers are paid a maximum of \$3 a day, Mr. McDonald reported to the convention. "A gradual reduction in the number of employees has been made . . . for reasons of economy," McDonald said.

Smaller Salaries Listed

While salaries of SWOC officials were not made known, it was disclosed that the union's stenographers receive from \$20 to \$37.50 a week with accountants and auditors' salaries "approximately" the maximum paid stenographers.

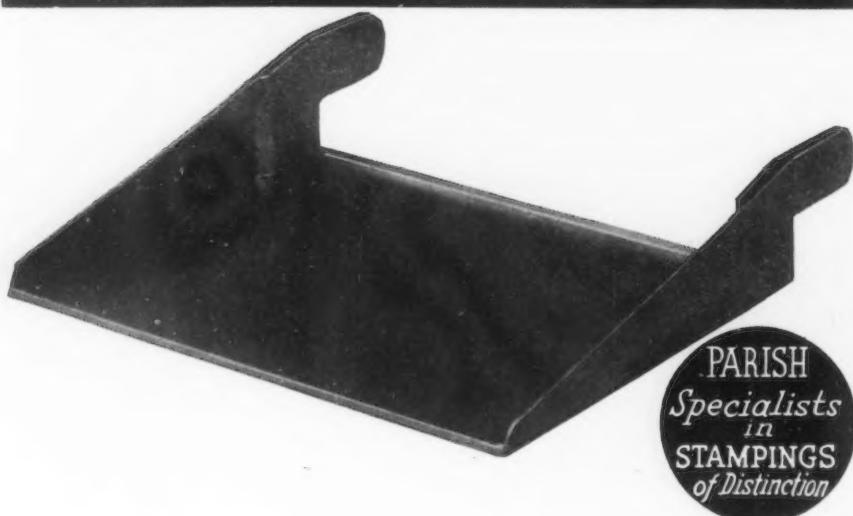
Regarding expense to the union of last spring's strike in plants of four large steel manufacturers, the SWOC secretary-treasurer reported that "hundreds of thousands of dollars were drawn from the resources of the SWOC and used to purchase food and clothing for the strikers and their families and to defray the expenses of the active pickets. On three occasions the executive officers requested that steel workers donate money for strike relief purposes," he said.

Wrote Congressmen's Speeches

The SWOC took credit at the convention for writing pro-labor speeches and the committee's report to the convention said:

"We have . . . helped in the preparation of speeches for SWOC men, college professors, Congressmen and Senators, both in state

WE WANTED IMPROVEMENT



THE inclinator step illustrated is of pressed steel $1/8$ " thick; 15 " x $15\frac{1}{2}$ " x $3\frac{3}{8}$ " high. The welded end lugs provide the necessary strength, at less cost than is feasible by any other method.

This is typical of what Parish engineers are able to accomplish, by a skillful combination of stamping and welding, to provide better parts of improved appearance and lowered final cost.

Whether the stamping be simple or complicated, large or small, complete as it comes from the press or involving building up thru other operations, we welcome the opportunity to discuss the problem with you.

PARISH PRESSED STEEL CO., READING, PA.

Pacific Coast Rep.: F. Somers Peterson Co., 57 California St., San Francisco, Cal.

legislatures and in Washington, all telling the story of SWOC."

The "most outstanding and baffling" problem confronting the union is the introduction of continuous strip mills in the steel industry, Murray told the convention.

Afterwards the delegates urged that SWOC officials submit to Congress a request for a Government survey of curtailed job opportunities due to technological improvements such as the continuous mills.

Late in the convention John L. Lewis belabored the SWOC-CIO foes on all fronts and shouted that "labor is not stopped. The SWOC . . . and CIO . . . and a great membership will continue through this depression. When opportunity presents itself, the CIO will arise and go forward . . ."

Scrap Rail Rate Plan Withdrawn

PROPOSAL by the railroads in the Southwest to place scrap iron freight rates on the basis of iron and steel products, has been withdrawn by the Southwestern Freight Bureau, according to Benjamin Schwartz, director general of the Institute of Scrap Iron and Steel. The proposal provided that affidavits must be submitted by the scrap shipper certifying to the fact that the scrap was actually remelted, after which the freight rate on any shipment would be adjusted on the scrap iron basis.

New Armco Road Joint Developed

A NEW type of highway expansion joint made of Armco ingot iron and distributed for road work by the Chicago Steel Products Co., Chicago Heights, Ill., is attracting interest. These Cross-lode joints offer no resistance to closing when the concrete expands, prevent entry of foreign material, and are designed to withstand the shock of loads rolling from one slab to another across the joint.

New High Record in British Pig Iron

ONDON (Special Correspondence). A new record post-war output of pig iron is the feature of the United Kingdom's iron and steel production figures for

October. The pig iron figure of 769,600 tons compared with the previous highest output of 752,400 tons in August, 1920.

In announcing these figures, the British Iron and Steel Federation states that this result augurs well for fulfilment of the higher outputs for which the industry has planned.

There were 133 furnaces in blast at the end of October compared with 132 furnaces at the end of September, four furnaces having

been blown in during the month and three having ceased operations.

The production of pig iron in October includes 169,500 tons of hematite, 421,400 tons of basic, 142,900 tons of foundry, and 20,900 tons of forge pig iron.

Production of steel ingots and castings in October amounted to 1,133,600 tons, the second highest figure for the year and exceeded only by the September output of 1,163,000 tons. Production in October, 1936, totaled 1,060,500 tons.

CENTRAL
Open-Hearth
Sheared and Universal
STEEL PLATES

CENTRAL
Quality Products

- Sheared and Universal Plates
- Forging Blocks, Slabs
- Blue Annealed Sheets
- Flanged and Dished Heads
- Steel Stampings

ROLLED STEEL
FLOOR PLATES

"All-Way-Grip" "Knobby"
"Knobbyette"

The established policy of this Company is to have its officials give their careful attention to all manufacturing processes. In this way close control is maintained, and customers are assured that every requirement is properly met.

Repeat orders have shown the value of this policy to customers as well as to the Company.

CENTRAL IRON & STEEL CO.
HARRISBURG **PENNSYLVANIA**

Lubrication of Pinions And Roll Neck Bearings

(CONTINUED FROM PAGE 39)

difference in the results has been observed after 1½ years of service.

Nowhere in a steel plant are lubricants subject to the severe beating which they suffer in the rear drive of an automobile. If the level of oil in a bloomer pinion were raised but a few inches above the pitch line of the lower gear, the oil would foam out of the top of the housing, and lubrication would then fall off. Undoubtedly the rear drive of an automobile causes severe foaming, and special lubricants are required to enable them to hang on under a necessarily poor condition of application. Such conditions do not exist in a steel mill where there is usually plenty of room to allow proper application of the lubricant, as well as sufficient cooling and settling.

As to the high lubricity resulting from the addition of various compounds or oiliness agents to these lubricants, there are undoubtedly places where this added virtue would be of advantage.

TABLE 8—STUDY OF ROLL NECK BEARINGS, PLANT B

| Mill | Type of Bearing | Average Tonnage | Lubrication and How Applied |
|-------------------------|----------------------|-----------------|-----------------------------|
| 46-in. Bloomer | Babbitt and bronze.. | 52,000 | No. 5½ tallow graphite |
| 40-in. Bloomer | Babbitt and bronze.. | 219,000 | block grease |
| 27-in. and 24-in. Skelp | Babbitt and bronze.. | 213,000 | No. 4½ tallow graphite |
| 21-in. Skelp | Babbitt and bronze.. | 27,000 | block grease |
| 21-in. Skelp | Lignum vitae | 47,500 | Water |
| 21-in. Skelp | Fabric | 113,200 | Water |
| 24-in. Billet | Babbitt and bronze.. | 100,140 | No. 4½ tallow graphite |
| 18-in. Billet | Babbitt and bronze.. | 800 | block grease |
| 18-in. Billet | Lignum vitae | 49,360 | Water |
| 18-in. Billet | Fabric | 60,000 | Water |
| 12-in. Skelp, St. 1-2 | Babbitt and bronze.. | 2,800 | No. 4½ tallow graphite |
| 12-in. Skelp, St. 3-8 | Babbitt and bronze.. | 230 | block grease |
| 12-in. Skelp, 3-8 | Lignum vitae | 8,000 | Water |
| 12-in. Skelp, 3-8 | Fabric | 20,000 | Water |
| 26-in. Rail, rough | Babbitt and bronze.. | 12,738 | No. 4½ tallow graphite |
| 26-in. Rail, finish | Babbitt and bronze.. | 18,000 | block grease |
| 60-in. Univ. Hor. T & B | Babbitt and bronze.. | 5,600 | No. 4½ tallow graphite |
| 60-in. Univ. Hor. T & B | Brass | 22,000 | block grease |
| 60-in. Univ. Hor. T & B | Lignum vitae | 10,000 | Water |
| 60-in. Univ. Hor. T & B | Fabric | 50,000 | Water |
| 60-in. Univ. Vertical | Babbitt and bronze.. | 50,000 | No. 2 cup grease, system |
| 110-in. Plate T & B | Babbitt and bronze.. | 3,575 | No. 4½ tallow graphite |
| 110-in. Plate T | Brass | 12,510 | block grease |
| 110-in. Plate T & B | Fabric | 60,000 | Water |
| 160-in. Plate T & B | Babbitt and bronze.. | 10,000 | No. 4½ tallow graphite* |
| 12-in. Rod, rough | Babbitt and bronze.. | 12,000 | No. 4½ tallow graphite* |
| 12-in. Rod, rough | Lignum vitae | 35,000 | Water |
| 12-in. Rod, rough | Fabric | 125,000 | Water |
| 10-in. Rod, finish | Babbitt and bronze.. | 6,000 | No. 4½ tallow graphite* |
| 10-in. Rod, finish | Lignum vitae | 55,000 | Water |
| 10-in. Rod, finish | Fabric | 200,000 | Water |

* Block grease.

Cases where oil of this nature has proved helpful include high speed gears running in a bath

of limited size in a small casing, or small high speed bearings in high temperature positions. On the whole, however, most equipment in steel mills is designed with comfortable safety factors, liberal tolerances and proper methods for applying lubricants, and plain oil or grease of good quality will therefore answer the purpose satisfactorily.

ARMSTRONG

Drop Forged

WRENCHES



With 51 types always in stock . . . all millings, all sizes from tiny miniatures to great 2-man wrenches . . . there are standard ARMSTRONG WRENCHES readily available to meet any normal industrial requirement. And, for those special demands, call for special wrenches and special millings, an ample stock of forged wrench blanks is maintained to assure delivery on short notice.

ARMSTRONG Wrenches are quality wrenches drop forged from special analysis steel, improved in designs, in proportions and balance. They are heat treated, hardened and finely finished in black baked enamel with heads ground bright and plainly marked for size. They are stronger, finer tools, still cost no more than other quality wrenches.

ARMSTRONG BROS. TOOL CO.

"The Tool Holder People"
309 N. Francisco Ave. CHICAGO, U. S. A.

Eastern Warehouse & Sales: 199 Lafayette St., New York, N. Y.
San Francisco London

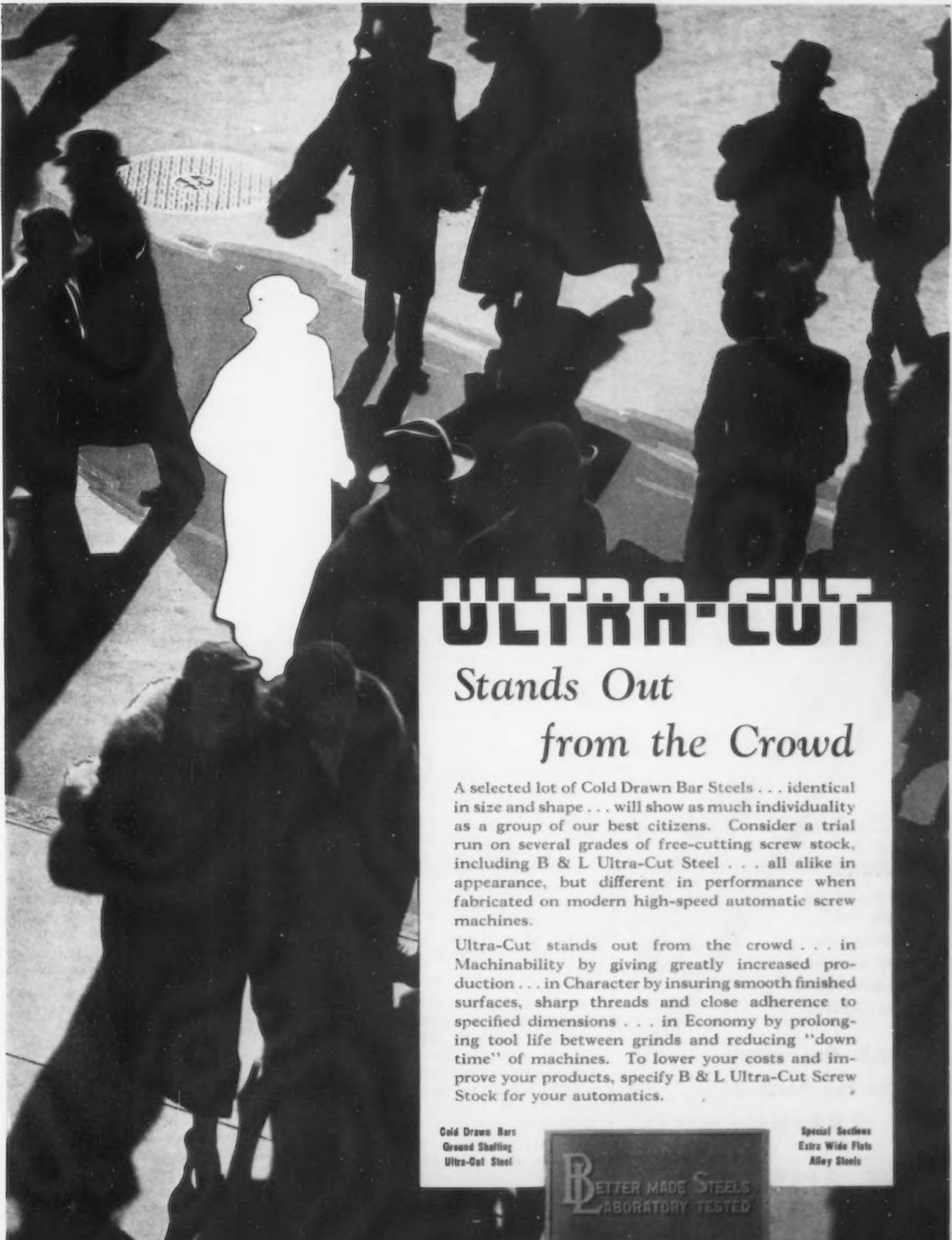


**51 STANDARD TYPES with
openings milled
for . . .**
**U. S. Standard
American Standard
S. A. E. Standard
Whitworth Standard
and Metric Standard**

Sixth Standard Oil Tanker Is Launched

THE *Esso Houston*, sixth of 10 new oil tankers in a \$16,000,000 building program of the Standard Oil Co. of New Jersey, was launched Dec. 18 by Federal Shipbuilding & Dry Dock Co., subsidiary of the United States Steel Corp. at Kearny, N. J. It followed two sister ships from a design Federal adopted in 1934 to improve efficiency of oil carriers.

The *Esso Houston*, an oil burner with a sea speed of over 12 knots, is 450 ft. long, has a deadweight capacity of 13,000 tons, and a cargo capacity of over 4,400,000 gallons.



ULTRA-CUT

Stands Out
from the Crowd

A selected lot of Cold Drawn Bar Steels . . . identical in size and shape . . . will show as much individuality as a group of our best citizens. Consider a trial run on several grades of free-cutting screw stock, including B & L Ultra-Cut Steel . . . all alike in appearance, but different in performance when fabricated on modern high-speed automatic screw machines.

Ultra-Cut stands out from the crowd . . . in Machinability by giving greatly increased production . . . in Character by insuring smooth finished surfaces, sharp threads and close adherence to specified dimensions . . . in Economy by prolonging tool life between grinds and reducing "down time" of machines. To lower your costs and improve your products, specify B & L Ultra-Cut Screw Stock for your automatics.

Cold Drawn Bars
Ground Shafting
Ultra-Cut Steel

Special Sections
Extra Wide Flats
Alloy Steels

BETTER MADE STEELS
LABORATORY TESTED

BLISS & LAUGHLIN, INC.

HARVEY, ILL.

Sales Offices in all Principal Cities

BUFFALO, N.Y.

USE BISCO TUBING YOU PAY LESS -for Steel -for Labor

There is no need to pay for steel you don't use, or the labor needed to cut it into small chips . . .

Yet that is just what you do, when you make bushings and rings from solid stock.

It's better to make them from BISCO STEEL TUBING—which comes in all diameters up to 14 inches.

Have some in stock, of the sizes most often used. You'll save time as well as money.



BISCO TUBING

Tool Steel
Alloy Steel
Stainless Steel
Cold Drawn Steel
For Mechanical Uses
For Ball Bearings

All fine steels
in the form of
TUBING

THE BISSETT STEEL COMPANY

945 East 67th St.
CLEVELAND, OHIO

1036 West Lake St., Chicago, Illinois

ORDER FROM STOCK

...OBITUARY...

TIMOTHY BURNS, who was general manager of the Lackawanna plant of the Bethlehem Steel Corp. from 1922 until his retirement in 1936, died at Bethlehem, Pa., on Dec. 11, aged 60 years. After his graduation from Lehigh University in 1901, he went with the Cambria Steel Co., where he was employed in the bar mills at Johnstown, Pa., until 1908. He left the Cambria company in that year to become identified with the Carnegie Steel Co.'s Duquesne plant, also in the bar mills. In 1912 he was made general superintendent of the Pittsburgh Crucible Steel Co., from which he resigned five years later to join the Bethlehem Steel Co., where he was engaged on general construction of furnaces and mills of the Sparrows Point plant. Mr. Burns was later transferred to the Saucon plant of the Bethlehem company as general superintendent and appointed general manager of the Lackawanna plant in 1922. After his retirement in 1936, he continued with Bethlehem in an advisory and consulting capacity.

FRANK BAXTER, chairman of Baxter, Fell & Co., Ltd., London, died on Dec. 8, aged 52 years.

T. MEREDITH EVANS, managing director of the Beaufort Tin Plate Co., Ltd., Wales, died on Dec. 11.

SIMON MARCHAND, senior partner in the firm of Wolf & Marchand, Amsterdam, The Netherlands, died on Dec. 9.

SAMUEL MOORE, general superintendent of service and erection of the Allis-Chalmers Mfg. Co., Milwaukee, died on Dec. 14, aged 68 years. He entered the employ of the predecessor concern, Edward P. Allis Co., in 1890 as a machinist apprentice. Later he spent some years abroad as supervisor of erection, and returned to become district superintendent of erection in New York. In 1911 he was transferred to the head offices in Milwaukee and some years later was given charge of all service and erection activities.

NATHANIEL B. LUDLUM, formerly in charge of personnel and compensation for the Bethlehem Steel Co.,

died Dec. 13 in Buffalo. He was born in Sussex County, N. J., and started as a clerk in the employment office of the Bethlehem company. He held successfully the positions of claim agent, safety superintendent and employment manager. He was management's representative for 20 years until his retirement in 1929. He was in charge of personnel and compensation.

* * *

CHAUNCEY A. CORNELL, an engineer and inventor who had served the Packard Motor Car Co. for 20 years, died Dec. 15 at his home in Detroit. Born May 22, 1867, in Hudson Falls, N. Y., Mr. Cornell's earlier work in engineering was in association with Stephen D. Field, son of the Atlantic cable inventor. Mr. Cornell helped perfect the Quadruplex by means of which multiple messages were first cabled simultaneously.

* * *

HOWARD M. THOMPSON, a special supervisor for the Detroit Edison Co., died Dec. 15 in Detroit. Born in Utica, Mich., Dec. 18, 1866, he went to Detroit 30 years ago, after graduation from the University of Michigan in 1904.

* * *

BENJAMIN ROBINSON, an electrical engineer with the Packard Motor Car Co. since 1929, died Dec. 15. Born in Cleveland in 1881, he had lived in Detroit for 30 years.

* * *

ALBERT F. GAMMETER, treasurer of the Bridge & Beach Mfg. Co., maker of stoves, St. Louis, died of heart disease at the age of 73. Mr. Gammeter came to America from Switzerland 50 years ago, and started with Bridge & Beach as a bookkeeper. He later became cashier and then treasurer.

COMING CONVENTIONS

Jan. 24 to 28—International Heating and Ventilating Exposition, Grand Central Palace, New York.

Feb. 10 to 12—Annual conference of the iron, steel and allied industries, Del Monte, Calif. E. H. McGinnis, 920 Wilshire Boulevard, Los Angeles, is chairman of the conference committee.

March 10 to 11—Aeronautic meeting, Society of Automotive Engineers, Inc., Mayflower Hotel, Washington. John A. C. Warner, 29 West 39th Street, New York, is secretary.

Auto Union, Facing Slump In Dues, To Concentrate On Ford

DETROIT, Dec. 21.—"Entire resources of the UAW are behind the Ford campaign" and the union is willing to put aside all other issues concentrating on the organization of the Ford Motor Co. Rouge plant in Dearborn, Mich., it has been learned.

With more than half a million auto workers out of work for two or more weeks during the holiday period, including those who have been laid off "indefinitely" the UAW treasury has been so badly stricken that voluntary contributions of 10 per cent of weekly salaries have been asked of executive board members and more than 100 organizers.

Homer Martin, president, has announced that he will donate 20 per cent of his \$5,000 annual salary to the cause. According to Richard T. Frankensteen, assistant president and organizational director for the Ford drive contributions of \$10,000 have been received from Flint, \$5,000 from the Dodge local and altogether \$50,000 has been collected at the rate of \$1 per member.

With Ford the only motor manufacturer in real production, it is believed that the union will attempt to cut short impending negotiations with General Motors and Chrysler because wage parleys are taboo in the face of the recession.

Employment will suffer seriously beginning this week when virtually every plant in the vicinity of Detroit will close for at least two weeks.

100 Coal Marketing Areas Are Mapped

CINCINNATI, Dec. 21.—Appalachian Coals, Inc., pioneer regional marketing agency, has prepared and mailed to its affiliated companies, which mine and sell high volatile bituminous coals from Kentucky, Tennessee, Virginia and West Virginia, maps of more than 100 market areas defined by the National Bituminous Coal Commission. The agency's office is in the Transportation building, Cincinnati.

**30 YEARS EXPERIENCE
IN TUBE MAKING**

*a plus asset
you can't buy
everywhere!*

Call Ohio
for
**PROMPT DELIVERY
of
QUALITY MADE**

Electric Welded
Tubing

The  **OHIO
SEAMLESS TUBE CO.**
OHIO SPECIAL QUALITY
Shelby, Ohio

SEAMLESS MECHANICAL TUBING . . . Carbon and Alloy Steels.

SEAMLESS PRESSURE TUBING . . . Boiler Tubes, Merchant and Locomotive
Heat Exchanger and Condenser Tubes in Plain Carbon,
Special Alloy or Toncan Iron.

SEAMLESS AIRCRAFT TUBING . . . SAE 4130X and SAE 1025 to Government
Specifications in "Ohio Special" Non-Oxidized Surface Finish.

ELECTRIC WELDED TUBING . . . For all Mechanical Purposes.

UPSETTING — FLANGING — TAPERING AND BENDING





Address the Factory or Our Nearest
Warehouse.

CHICAGO, 726 W. Washington Blvd.
PHILADELPHIA, 12th & Olive Sts.
NEW YORK 47 Murray Street
LOS ANGELES 1015 East 16th St.

• Don't hesitate to make us prove what we say about Cleveland Cap Screws and Set Screws. We make so many tests and inspections ourselves before shipment to a customer that we do not fear the results of any tests you may give our products. When we say they are extremely accurate—check it. When we say these screws are stronger—you be the judge. Made by the Kaufman Process, patented, our own plant development—we know our products are right. Give them a trial. THE CLEVELAND CAP SCREW CO., 2929 East 79th Street, Cleveland, Ohio.

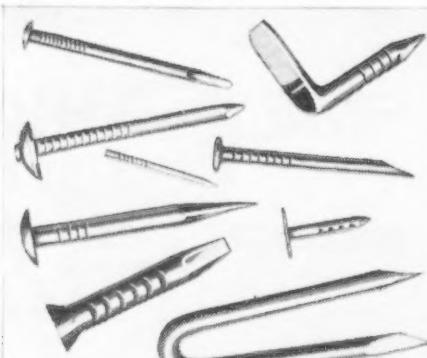
CLEVELAND CAP SCREWS SET SCREWS • BOLTS AND NUTS

**10,000
TYPES AND
SIZES**

Continental nails are noted for uniformity—full, well centered heads, sharp points, accuracy of gauge and length. They are made from the most suitable grade of steel for the service involved. Furnished from $\frac{3}{16}$ -inch No. 22 brads to 10 by $\frac{3}{8}$ -inch spikes in a wide variety of regular and special finishes and packaged for every class of trade. Write for catalog showing styles and other features. Special nails designed for manufacturers who have unusual needs.

CONTINENTAL STEEL CORP.

General Offices: Kokomo, Indiana
Plants at Canton, Kokomo, Indianapolis



NAILS AND BRADS



Steel Industry's

Repair Costs

For 1936 Totaled

\$227,000,000

M AINTENANCE and repair bills paid by integrated steel companies in 1936 amounted to \$227,900,000, equivalent to more than 9 per cent of their sales volume, the American Iron and Steel Institute estimates with data from companies with 88.6 per cent of the industry's ingot capacity.

Cost of repairs and maintenance was entirely separated from the total of \$135,000,000 which was reserved for depreciation and depletion of equipment and properties, yet alone amounted to 50 per cent more than the net earnings in 1936 of the companies supplying the information. In addition to the expenditures in 1936 for repairs to existing equipment, the steel industry spent \$216,000,000 for new equipment last year.

Charges Up Two Fifths

Reflecting the higher rate of steel output in 1936, charges for repairs and maintenance were more than 40 per cent larger than the 1935 total of \$161,500,000.

The steel industry's maintenance and repair charges include the costs of keeping in good condition blast furnaces, steel-making furnaces and rolling mills as well as the ore and coal mines and the water and rail transportation systems operated by the industry.

Bulking large in the expense of steel mill upkeep in 1936 was the cost of relining coke ovens, blast furnace stacks and stoves, and furnaces for melting and heating steel. Other important items covered the upkeep of steel rolls for the rolling mills, and the maintenance of the tens of thousands of electric motors which operate much of the industry's equipment.

National Steel Corp. declared a quarterly dividend of 62½c. a share on 2,167,877 shares of outstanding capital stock and in view of the federal surtax, authorized an additional payment of 50c. a share, payable Dec. 24 to stock of record Dec. 17.

Weirton Vote Discredits NLRB Claims; Lewis Union Foe Says

WEIRTON, W. Va., Dec. 21.—Supporters of the employees representation plan of collective bargaining in Weirton Steel Co. plants this week saw a severe defeat for John L. Lewis and his Steel Workers Organizing Committee in results of the Weirton plant election.

Officials of the National Labor Relations Board refused invitations to "see with their own eyes" how the plant election was run, according to John Larkin, general chairman of the Weirton employees representatives organization. Mr. Larkin said:

"There were 9928 employees eligible to vote in this election. Of this number 8600 were at work during the 24 hr. period of the election. The total number that voted was 9447.

"This means that about 850 employees, or more than two thirds of the employees who were off duty during the election, thought enough of the representation plan to come into the mills during their leisure time to cast their ballots for the fellow employees they wanted as their representatives.

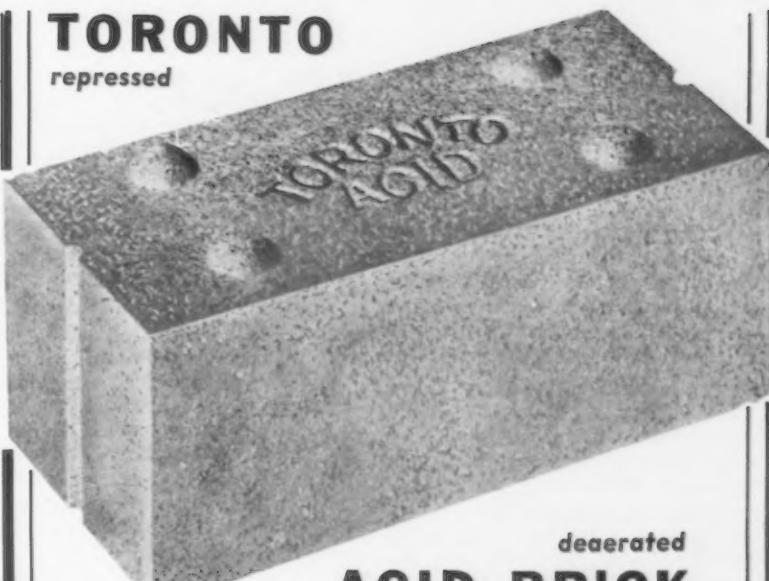
"In other words, of all the employees eligible to vote, 95.16 per cent actually cast a ballot. This has been one of the most successful elections in the history of the plan. There is probably not a municipal election in the United States that could match it in voter interest.

"We believe that it shows conclusively what the men who do the actual work down in the mills think about this matter of collective bargaining. This election of, by and for the real workers of Weirton tells a lot more about what the real workers of America are thinking than all the fancy worded arguments of Labor Board theorists.

"We regret that Trial Examiner Edward Grandison Smith and the Labor Board attorneys refused the sincere invitation of the employee representatives to come over to the mills on election day and see with their own eyes how fairly these elections are conducted and the enthusiasm of the men who take part in them."

TORONTO

repressed



de aerated

ACID BRICK FOR USE WITH BASOLIT

Tank walls and floors laid up with Toronto Acid Brick and Basolit, the acid-proof cement joint, are really acid proof. Repressed, de-aerated, dense and impervious to any acid action, Toronto Acid Brick are precisely molded in stock and special shapes. Accurate spacing buttons and end grooves insure uniform self-anchoring joints at minimum labor costs. Write for free samples and full information.

THE KEAGLER BRICK COMPANY

STEUBENVILLE, OHIO

Fire Clay, Acid Resistant Brick, Fire Clay Mill Brick, Pickling Tank Linings, Acid Proof Construction, Paving Brick, Paving Block, Chimney Stack Brick.



*We have been making
SPRINGS for 92 years*

—so we've been told

*Even so, we don't know all about springs—but all
we do know is about springs*

We make springs of round wire, square wire, oblong wire; we make them to compress, to stretch, and we make torsion springs. We take flat spring steel and stamp out every conceivable shape from dies made to suit your wants.

If you use springs in quantities anywhere from one single, lone-some spring to a trillion, we will write quotations or call and discuss your springs with you. And we'll try our best to make them at a price to suit your pocketbook and in time to suit your needs.

ESTABLISHED 1845

DUNBAR BROS. CO., Bristol, Connecticut
DIVISION OF ASSOCIATED SPRING CORPORATION

British Consumers Welcome Steel Price Stabilization

ONDON (Special Correspondence).—The decision of British basic steel manufacturers to maintain current prices over the whole of 1938 has, generally, been welcomed by steel consumers in the United Kingdom.

It was fully expected that no increase in prices would be made, but stabilization over an entire year undoubtedly came as a surprise. In view of falling world prices, some consumers are asking whether it will be possible to maintain existing schedules over so long a period.

A. J. Grant, president of the Sheffield Chamber of Commerce and managing director of Thomas Firth & John Brown Ltd., is convinced that 12 months' price stabilization is a good thing for any industry.

Make Sacrifice

Iron and steel prices, he declared, have dropped far enough and anything that can keep them stabilized will help to keep the flow of orders going. He points out that steelmakers are making a big sacrifice in not raising the price of iron and steel. In his opinion steel consumers will not hang back now they know that prices are going to be constant.

F. Cresswell Pyman, managing director of William Gray & Co., and president-elect of the Shipbuilding Employers' Federation, says it is impossible to say what effect the stabilization decision will have upon shipbuilding.

"Generally speaking," said Mr. Pyman, "shipbuilders consider steel prices are too high. If a steady volume of new work is to be attracted to the yards it is hoped to get together suppliers of all materials employed in ship construction to see if lower prices cannot be established and the cost of new construction reduced."

British Revise Scrap Price Schedule

ONDON (Special Correspondence). Two new developments of interest in the British Iron and steel industry have just been announced in London—the revision of the scrap price schedule and the formation of a central organization

to be known as the Federation of Iron and Steel Merchants.

Announcement of the new scrap price schedule is made without disclosure of details. It will operate from Jan. 1 next and, although it has been settled for no definite period, it is probable that it will last for at least six months. Under the schedule quotations have been raised for certain grades, while for others they have been reduced. In most cases, however, there is practically no change.

There are 15 recognized specifications for scrap for use in British steel works. As prices of these vary within the 10 districts controlled by the British Iron and Steel Federation, their settlement is a complicated business. Altogether it is estimated that there are no fewer than 225 classes of scrap material, ranging in price from £2 to £3 10s. (\$10 to \$17.50) per ton.

For the rest of the current year

quotations for scrap are regulated in accordance with the agreement made last February, under which the British Iron and Steel Federation undertook that its members would not sell scrap for export.

Udylite pH Indicator Papers

A METHOD of determining the pH of plating solutions at the tank in as little as five seconds was recently announced by the Udylite Co., Detroit. pH Indicator Papers used for this purpose are graded for pH range, and require no technical knowledge to read or understand. pH papers consist of strips of a special paper, impregnated with a highly sensitized indicator and a scale of color bars, each bar being of a different color and having a definite pH value. When the strip is dipped into the solution the indicator will change color. By comparing the color of the indicator with the colors of the color bars, the pH value of the solution, it is said, can easily be ascertained.



YOU CAN TURN IT BETTER, FASTER.

In use a test paper of the desired pH range is selected, dipped for a second in the solution, held to the light and the correct pH reading is instantly obtained by color comparison.

pH papers are also adaptable for determining the pH of alkaline cleaners, a method favored to maintain maximum cleaning efficiency.



Cleaners are compounded to give the desired pH and such emulsifying agents are employed which reach the maximum efficiency within the predetermined pH range.

These papers come packed 200 in a box, take up little space, and can be carried in the pocket or kept in a convenient place near plating solutions ready for instant use.

Automobile Makers Against Price Fixing

WASHINGTON, Dec. 21.—Adhering to its historic policy, the automobile industry again has gone on record against price fixing. Speaking through its president, Alvan Macauley, the Automobile Manufacturers' Association, last week, waived opposition to an investigation of manufacturer-dealer relations but suggested that if it is held desirable it be made clear that the Congressional purpose is not to bring about any condition leading to price fixing or to unreasonable or unnecessary increases in prices to the consumer.

The automobile industry's position was set forth in meeting an attack on it by a resolution of Representative Withrow of Wisconsin.

Tin Plate Scrap Restrictions Grow

WASHINGTON, Dec. 20.—Additional restrictions on tin plate scrap exports were announced recently by the State Department's Munition Control Board.

The Board ruled that producers will be limited in their exports for 1938 to 25 per cent of their 1936 exports provided they plan to export 25 tons or more.

An exception was made for small operators who anticipate their 1938 exports will be 25 tons or less. Their requests may be granted in full if they agree to produce at least the equivalent of their requested allotment.

The Board will subsequently fix a total export figure and will apportion exports among individual companies on the basis of their 1936 production, but no allotment will exceed the requested amount unless the total of allotments requested is below the total export figure fixed. Allotment requests were due in Washington not later than Dec. 20.

SWOC Reports 153,222 Steel Workers Dropped

PITTSBURGH, Dec. 21.—John L. Lewis' Steel Workers Organizing Committee this week issued results of its own survey of unemployment in the steel industry and allied fabricating plants. The survey, according to Philip Murray, SWOC chairman, showed:

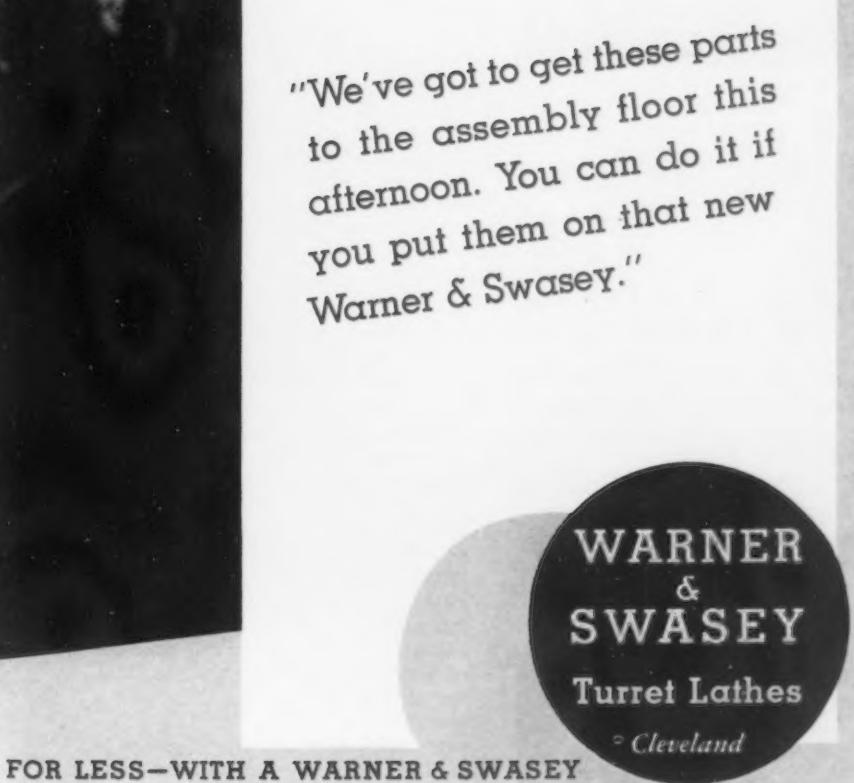
(1) Twenty-eight per cent or 153,222 men have been paid off completely.

(2) Fifteen per cent or 84,674 men still are working full time or five days each week.

(3) Fifty-seven per cent or 309,007 employees are working part time or from one to three days a week.

George D. Miller Co., machine tool dealer, has moved its offices to 509-11 Rockefeller Building, Cleveland.

Stiflitz Furnace & Foundry Co., Louisville, Ky., has purchased patterns, flasks and other equipment of the Kentucky Stove Co., Louisville, manufacturer of stoves for 40 years.



"We've got to get these parts to the assembly floor this afternoon. You can do it if you put them on that new Warner & Swasey."

FOR LESS—WITH A WARNER & SWASEY

Gear Production Problems Feature at S.A.E. Production Meeting at Flint

ABROAD picture of the production problems of the automobile industry and a wealth of specific information about forging, casting, welding, machining and finishing automotive parts was furnished at the National Production Meeting, Dec. 8 to 10, held by

the Society of Automotive Engineers at Flint, Mich. D. A. Wallace, president Chrysler Div., Chrysler Corp., gave what is probably the only published first-hand account of "Purchasing, Planning and Scheduling Parts for Building Multiple Model Automobiles." He

described all the steps necessary in the Chrysler division for the production of three distinct models with the usual variety of body types and the total of 72 standard motor combinations, 14 standard paint combinations, three standard trim combinations, plus special orders.

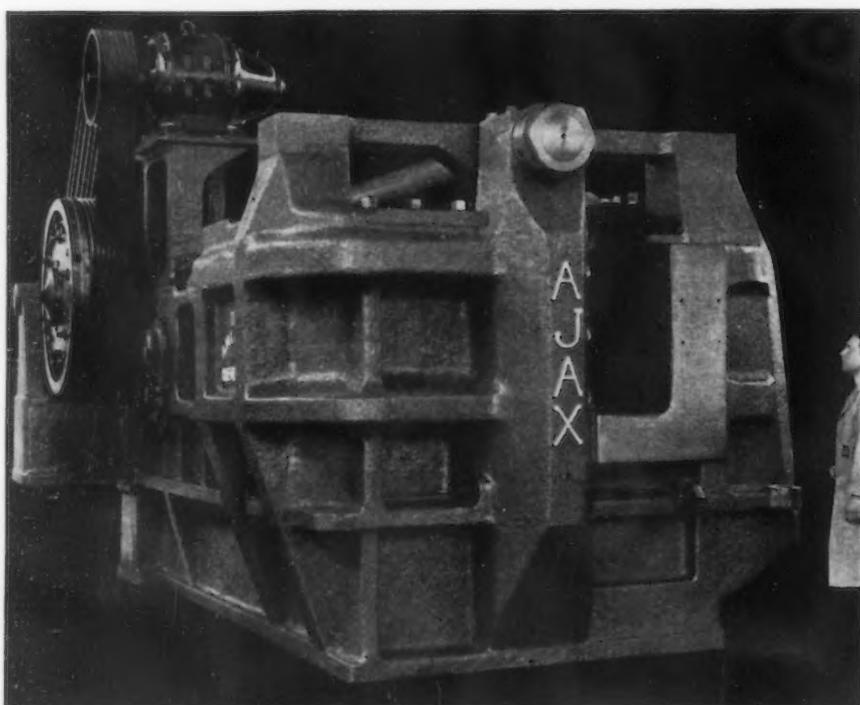
This paper was the background for a discussion of precision forging practice by L. A. Danse, of Cadillac Motor Co., who declared emphatically, "It is often cheaper to machine than to forge, depending on the contour." He advised the development of forging design and methods with contours such that the metal flow can occur naturally without internal shear, twists, buckles and waves. This regard for the laws of plastic flow is prominent in precision forging, he said, and the close control of surface dimensions is secondary.

A complete story of the machine tool set-up in the new plant for the manufacture of Buick and Oldsmobile automatic transmissions was given jointly by Charles A. Stanard, of Buick, and F. C. Pyper, master mechanic at Buick. Mr. Stanard presented the viewpoint of one interested in the mass production of accurate gears, revealing that fulfillment of the laws of geometry of gearing and close manufacturing control has eliminated final inspection. Mr. Pyper described peculiar machining problems on the new transmission and gears and revealed some of the planning and results achieved through the cooperation of nearly 100 machine tool builders who worked with Buick men in preparing equipment for the new plant.

A paper on current research in the synchronization of current and pressure in spot welding was offered by J. S. Williams, chief engineer, P. R. Mallory & Co., who illustrated his talk with data taken from current tests.

An outstanding discussion of grinding processes was presented by Roland V. Hutchinson of the Olds Motor Works.

"We have no quantitative values for many of the items needed in a rigid analysis of the general, or even of a particular problem in grinding," Mr. Hutchinson said. "When obtaining the *absolute* maximum result per dollar in grinding, conditions are somewhat like those of walking a tight rope. Plenty of minor influences are waiting in ambush to push one off, as it were." An appendix to his printed paper contained a mathematical analysis of the expression for the conformity of surfaces in grinding and a mathematical study of the characteristics of wheel interference in surface grinding and in external grinding with a plunge cut. He also



A Puff of Air Operates This Huge Forging Machine!

● A feather touch on the foot valve—a puff of air—and this huge Forging Machine swings into action! Thousands of times a day in the world's most progressive forge shops, the Ajax Air Clutch is repeating its cycle—daily setting new production records on all types of upset forgings.

Introduced and patented by Ajax, the Air Clutch won immediate favor with experienced forge men who term it the greatest single improvement in Forging Machines in twenty years. Its smooth, cushioned starting action and instantaneous treadle response has increased production as much as 25%—decreased fatigue of the operator—and totally relieved the machine of damaging clutch impact.

If you are interested in speeding up your forging operations, improving your product and lowering your costs, write today for further information on Ajax Air Clutch Forging Machines—Bulletin No. 65.

THE AJAX MANUFACTURING COMPANY

EUCLID BRANCH P. O. CLEVELAND

621 MARQUETTE BLDG., CHICAGO • 201 DEWART BLDG., NEW LONDON

AJAX

analyzed the effect of traverse in external cylindrical grinding and the inter-relation between work speed and traverse.

William F. Pioch, of the mechanical design department at the Ford Motor Co., discussed the casting and machining of Ford cast steel pistons and revealed that the Ford company has under construction at the present time an automatic inspection machine which will check all machine operations on the piston. In the entire machining phase on these pistons, he declared, there is less than 8/10 of 1 per cent scrap. The finishing of automotive parts in synthetic resin enamels was the subject of a paper by J. L. McCloud, also of the Ford Motor Co.

All these papers are too detailed to bear much abstracting, but a paper by R. B. Haynes of the Spicer Mfg. Corp. contains some comparative data on spline and gear cutting and finishing operations of real significance that can be succinctly restated in a few paragraphs.

Climb Hobbing

Over a period of 10 months, actual production results from the "climb" hobbing of splines at the Spicer plant in Toledo were so uniformly better, as compared to conventional hobbing, that certain definite conclusions are warranted. Climb hobbing may be described as that method where the cutting action starts at the surface of the part being hopped and ends at the root of the spline or tooth instead of vice versa. At Spicer, the only change in the machines involved changing gears to reverse the cutter spindle rotation. The conclusions Mr. Haynes reached are as follows:

1—Climb hobbing always yields a finish on the sides of the splines obviously superior to that obtainable by conventional cutting.

2—Climb hobbing is invariably accompanied by an increase of 20 to 30 per cent in hob life.

3—Climb hobbing consumes less power per cubic inch of metal removed. This will normally be in the ratio of 1.00 hp. for climb hobbing to 1.10 hp. for conventional hobbing.

4—Climb hobbing produces little or no burr on the splines, thereby reducing or eliminating subsequent burring operations.

5—The relative superiority of climb hobbing is not affected materially by coolants, speeds, feeds, or other factors in the operation.

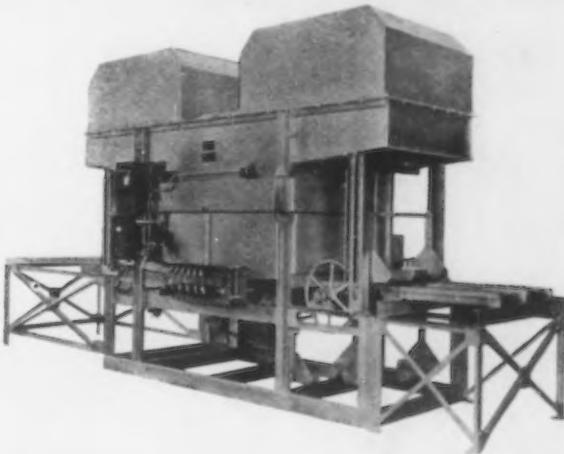
Similar results were obtained in climb hobbing gear teeth, but this

phase is still in the experimental stage. Finish of contours is superior, but not to the same degree as for splines. Some feel, also, that too fine a finish is not to be desired, if the gears are to be shaved subsequently. To some, slight feed waves are an advantage in the shaving process.

Shaving is broken into two distinct types, namely, the rack method and the circular cutter method. In this process, the master is an

accurately produced rack or circular cutter with small serrations on the tooth contours which, when advanced across the face of the gear, act as cutting edges under slight pressure and actually shave fine amounts of metal from the tooth contours of the gear being finished. The method in general produces a very high quality gear with all the accuracy built into the master rack or circular cutter. Where the two types are in use side by side cer-

DETREX DEGREASERS



Offer These ADVANTAGES For Added Profits

When you review the features of the Detrex Solvent Degreasing Process, you will see they mean profit for you.

POSITIVE CLEANING ACTION insures complete removal of oil and grease from your work, no matter what metal is being cleaned. Rejects are reduced to a minimum.

FASTER CLEANING CYCLE gives more work in less time. The entire operation requires but a few minutes.

SIMPLICITY OF PROCESS results in a lower labor cost. Unskilled workmen quickly become efficient operators.

UNIFORM PRODUCT FLOW is maintained because work emerges clean, warm, and dry—ready for subsequent operations. "Bottle-necks" are avoided.

CLEANLINESS AND CONVENIENCE are important. Muss, fuss, scrubbing, and extra drying operations are entirely eliminated.

SAFETY is assured by using Perm-A-Clor or Triad Solvent. These solvents are non-inflammable, non-explosive, and non-corrosive.

FLEXIBILITY is unapproached. Detrex units are available in any combination of vapor, liquid immersion, and hot solvent spray—conveyorized or hand-operated machines.

Because of these advantages you can maintain more uniform production, increase production speed, improve quality, and lower overall cleaning costs.

DETROIT REX PRODUCTS COMPANY

Metal Cleaning Engineers—Solvent Degreasing and Alkali Cleaning

13005 HILLVIEW AVENUE — DETROIT, MICHIGAN

New York Office: 130 W. 42nd St.

Chicago Office: 201 N. Wells St.

Cleveland Office: 812 Huron Road.

Cincinnati Office: Provident Bank Bldg.

tain factors present themselves repeatedly and with such force that it is impossible not to form some very definite convictions as to the value of each. These conclusions are summarized as follows:

1—It is more difficult and also more expensive to obtain an accurate master rack than to obtain an accurate master circular cutter.

2—The rack cannot be used as close to shoulders or other gears in a cluster as the circular cutter.

3—There is a factor in shaving operations difficult to define but commonly referred to as control. The gear being shaved is not restricted in its rotation with the master by anything except the master. If we are to impart uniform

angular velocity to this gear, it is necessary, of course, that the tooth spacing of the master be uniform, but there is also the factor of wrap or angle of contact between the gears. The rack type cutter is superior in this respect to the circular type cutter because of its inherently greater wrap. It has more control over the gear being finished.

4—The rack type is defective to the extent that any error in the master is transferred directly to the gear, due to the fact that as the gear is rotated each of its teeth always meshes with the same respective space in the master. With a circular cutter type a hunting tooth will average errors around circumference of the gear.

Each new gear to be shaved must be analyzed in the light of the conclusions drawn and allocated to the type of machine most likely to produce most accurate results.

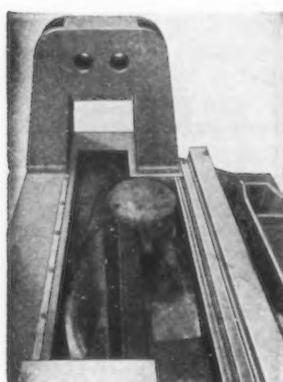
Mr. Haynes also discussed various methods of grinding gear teeth, usually necessary with gears having sections that shrink non-uniformly. A formed wheel grinder may be used, but usually the choice is some form of generation. Single and double dish wheels set at an angle to conform to the side of a rack tooth are in common use, but the method is slow and is restricted to gear teeth having a face length and clearance within the arc and chordal characteristics of the grinding wheel. Another type consists of a small wheel dressed to the shape of a complete rack tooth and passed through the gear teeth in short, shaper-like strokes, while the gear is rolled in the path of the gear by a master. Here a complete tooth is ground at one time, making for rapid production, and face lengths are limited only by the stroke characteristics of the machine.



MAEHLER OVENS
for all baking applications

The PAUL MAEHLER Co.
2218 W. LAKE ST. — CHICAGO

TRIPLE COMPRESSION SCRAP BALERS



STYLE
100 TC
(100 x 51 x 36)
and other sizes
▼
Also Regular
Double
Ram Presses
in all sizes



GALLAND-HENNING
MANUFACTURING COMPANY

2724 S 31st Street Milwaukee, Wisconsin

COMPLETE LINE OF BALERS: Electric and Hydraulic, also HYDRAULIC PRESSES AND PUMPS

Clark Brothers Exhibits Bolt Plant of 1840

FRONT walls and part of the roof of a historic old building erected in 1840 for manufacture of bolts and nuts have been reassembled and set up in the lobby of the office of the Clark Brothers Bolt Co., Milldale, Conn.

The boards are moss covered and weathered and the hand forged nails covered with rust. The windows with their unique design and the old batten doors with old hand forged hardware and squeaky hinges are just as in 1840. The wood shingles are warped and weathered but still good.

PERSONALS

(CONTINUED FROM PAGE 64)

Corp. of St. Joseph, Mich. Others elected at the association's annual meeting Wednesday, Dec. 15, at the Hotel Statler, Detroit, are: First vice-president, GEORGE HARDER, president, I. Stephenson Co., Wells, Mich.; second vice-president, W. J. CORBETT, vice-president, Sparks-Withington Co., Jackson; third vice-president, R. R. HICKS, president, American Steam Pump Co., Battle Creek; treasurer, M. J. MURPHY, president, Murphy Chair Co., Detroit.

To fill the unexpired terms of D. R. WILSON and R. R. HICKS, JULIAN B. HATTON, president, Eagle Ottawa Leather Co., Grand Haven, Mich., and JOHN L. A. GALSTER, president-treasurer, Petoskey Portland Cement Co., Petoskey, were elected directors.

To fill the unexpired terms of W. F. CORBETT and FRED WESTOVER, FRED M. MOORE, president, Diamond Crystal Salt Co., St. Clair, and M. SETH BABCOCK, chairman of the board, Bay City Shovels, Inc., were chosen.

For directors of the three-year term: L. C. WALKER, Shaw-Walker Co., Muskegon; HOWARD BLOOD, Norge Corp., Detroit; J. R. MILLAR, National Automotive Fibers, Inc., Detroit; SAMUEL CLARK, Baldwin Rubber Co., Pontiac, and L. C. UPTON, Nineteen Hundred Corp., St. Joseph, were named.



... New business quiet, but pressure for deliveries is unrelaxed.

ONDON, Dec. 21 (By Cable)— Seasonal influences are now developing and new business is quiet, but pressure for deliveries for heavy iron and steel is unrelaxed and record outputs are still being achieved.

Cleveland blast furnaces are heavily sold for the first quarter and still are in short supply with no early prospect of a material increase. Purchasing of foreign pig iron has ceased through the extension of the loyalty rebate scheme.

A shipment of 8000 tons of Brazilian iron ore is reported arrived at Tees. This is the first shipment

of the 400,000 tons recently purchased through the British Iron and Steel Federation for shipment over two years.

The tin plate market is quiet, with small improvement in the volume of inquiries. Unfilled orders are under 3,500,000 base boxes. Eleven months' exports amount to nearly a 100,000-ton increase over a year ago. Black sheets are quiet, and galvanized sheets are idle.

Stocks in Indian reported at about 40,000 tons. November shipments, all ports, only 8500 tons, a new post-war low record.

Laclede Steel Co., St. Louis, has declared a dividend of \$1.25 a share on its common stock, payable Dec. 27 to holders of record Dec. 17. The payment will bring to \$2 the total disbursements on the issue in the current year, compared with 90c. in 1936.

PERFORATED METAL

INDUSTRIAL and ORNAMENTAL

H & K industrial perforations embrace a range of sizes and shapes intended to meet the most exacting requirements of all industries.

H & K ornamental designs include standard and many beautiful and exclusive patterns suitable for architectural grilles, enclosures, ventilators, and all decorative uses.

Send us your specifications.

ANY METAL - ANY PERFORATION

The Harrington & King PERFORATING Co.

5657 FILLMORE ST., CHICAGO - 114 LIBERTY ST., NEW YORK



Straight Cuts, Angle Cuts, Notching, Coping, Mitering . . .

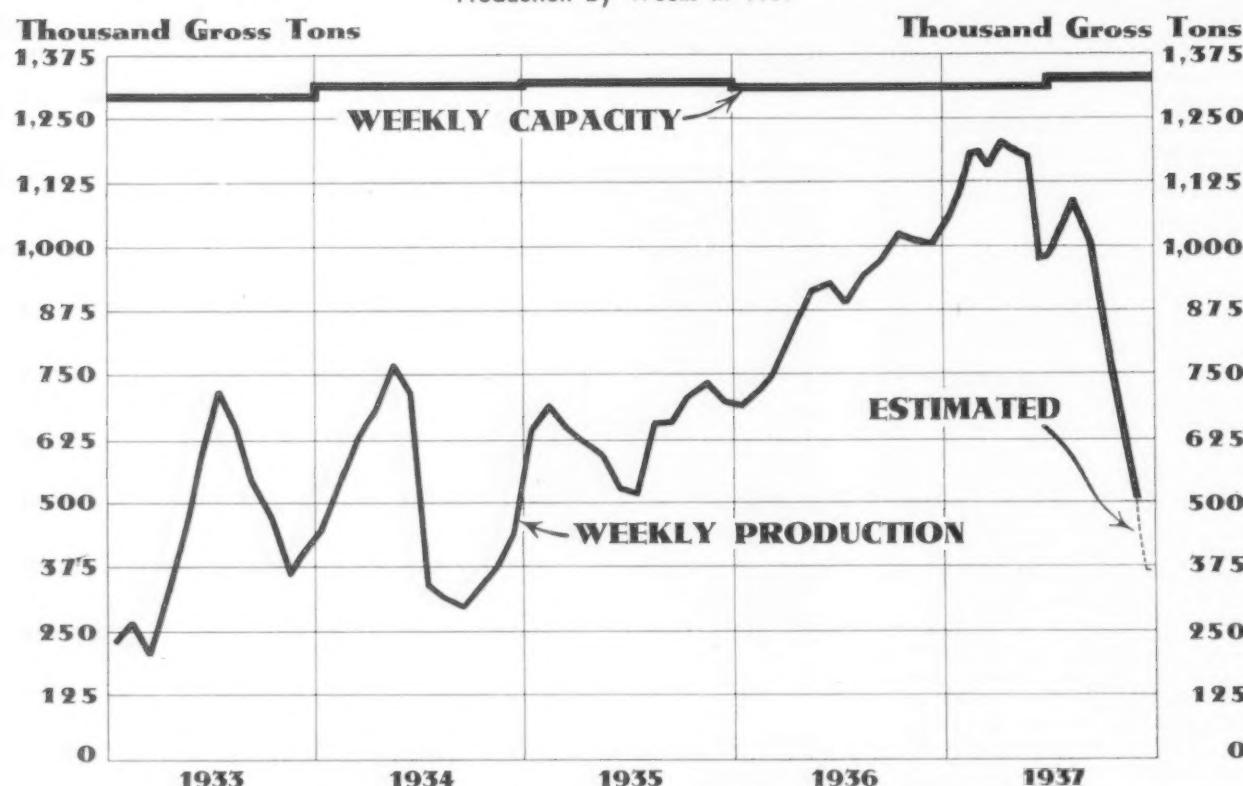
THE MARVEL No. 8 is the truly universal metal cutting saw, handling all work from $\frac{1}{8}$ " x $\frac{1}{8}$ " to 18" x 18". It is one of the most versatile multi-purpose saws built.

With its planer-type bed, hand and power feed, and swinging saw carriage that will feed the blade into the work at any angle from 45° right to 45° left, it gets in on every job to save labor and costly hours or to improve shop practice. It will save "warehouse cutting extras" on die plates. It will save hours of machining in roughing to form and shape. It will miter, notch, and cut off large work rapidly, or will nip off the smallest rod cleanly—will handle the heaviest job or the most delicate cut with equal efficiency. You will see them everywhere, and wherever you see one, it's the busiest machine in the shop.

ARMSTRONG-BLUM MFG. CO.
"The Hack Saw People"
5749 Bloomingdale Ave., Chicago, U. S. A.

PRODUCTION

Average Weekly Production of Open-Hearth and Bessemer Steel Ingots by Months, 1933-1937, and Estimated Production by Weeks in 1937



Figures for the Current Week Are Not Indicated on the Chart Until the Following Week

STEEL INGOT PRODUCTION BY DISTRICTS: Per Cent of Capacity

| | Current Week* | Last Week |
|--------------------|---------------|-----------|
| Pittsburgh | 17.0 | 24.0 |
| Chicago | 23.5 | 24.0 |
| Valleys | 21.0 | 27.0 |
| Philadelphia | 25.0 | 30.0 |
| Cleveland | 17.0 | 33.0 |
| Buffalo | 17.5 | 21.5 |
| Wheeling | 22.0 | 44.0 |
| Southern | 37.5 | 37.5 |
| Ohio River | 49.5 | 22.0 |
| Western | 55.0 | 55.0 |
| St. Louis | 12.5 | 13.0 |
| Detroit | 40.0 | 46.0 |
| Eastern | 20.0 | 40.0 |
| Aggregate | 23.5 | 27.5 |

* Allowance made for holiday.

Weekly Booking of Construction Steel

| | Week Ended | | | | Year to Date | |
|--|---------------|---------------|---------------|---------------|--------------|-----------|
| | Dec. 21, 1937 | Dec. 14, 1937 | Nov. 23, 1937 | Dec. 21, 1936 | 1937 | 1936 |
| Fabricated structural steel awards..... | 12,100 | 24,050 | 6,500 | 23,855 | 1,040,235 | 1,041,980 |
| Fabricated plate awards..... | 2,115 | 2,765 | 800 | 175 | 116,395 | 213,015 |
| Steel sheet piling awards..... | 0 | 100 | 0 | 2,355 | 64,165 | 56,325 |
| Reinforcing bar awards..... | 1,700 | 2,550 | 4,375 | 4,095 | 290,340 | 326,665 |
| Total Lettings of Construction Steel... 15,915 | 29,465 | 11,675 | 30,480 | 1,511,135 | 1,637,985 | |

... .SUMMARY OF THE WEEK. . .



... *Spotty improvement noted in orders and inquiries.*

◦ ◦ ◦

... *Sentiment in industry greatly improved as 1937 slips into discard.*

◦ ◦ ◦

... *Steel scrap gains 50c. at Chicago; ingot operations 23½%.*

DESPITE a further recession in steel ingot production to 23½ per cent of the country's capacity, spotty improvement in orders and inquiries is becoming more apparent, possibly a forerunner of more widespread buying interest some time in January. Meanwhile, another reduction in operations may occur during the mid-holiday week as some mills, which now are trying to give as much employment as possible just before Christmas, will be shut down this Thursday or Friday until New Year's Day.

The recent moderate gain in steel scrap prices has not gone further at Pittsburgh and Philadelphia, but a rise of 50c. a ton has occurred at Chicago, bringing THE IRON AGE scrap composite price up to \$13.58, the third consecutive weekly advance and 66c. a ton above the year's low point in November.

Much of this week's more hopeful news comes out of Chicago, where one important producer has had the largest sales since the week of Sept. 24. Operations in that area are also helped out by an increase by one company, which almost offset losses by others, resulting in a net reduction of only a half point in the district average to 23½ per cent.

Sentiment throughout the industry is decidedly improved, not because of any marked change in the situation, but on the ground that the worst probably will be over with the passing of 1937 and that 1938 is bound to bring some improvement, though it may be of very moderate proportions in the early part of the year at least.

Tangible evidences of a turn for the better are found in the condition of consumers' stocks, which in many, though not all, instances are below normal size and will soon require replenishment.

It is apparent that most of such early improvement as may come in 1938 will result from the rebuilding of depleted inventories of miscellaneous

consumers as the major outlets—building construction, the railroads and the automobile industry may not contribute a great deal of tonnage during the next month or so.

This, of course, is an off season for building contracts, except when, as was the case a year ago, there is a price incentive to rush them into the market. The Government's housing bill, whatever stimulus it may eventually afford, will be slow in getting into motion so far as steel requirements are concerned.

The railroads are cutting their orders so small that they are reluctant to accept even the small over-runs which are sometimes unavoidable in mill practice. However, it is probable that a favorable decision on higher freight rates will bring out a good deal of buying that is now being held back. For example, railroads centering at Chicago are expected to place between 150,000 and 200,000 tons of rails when the freight rate issue is settled. The Burlington, whose program for the building of 1250 cars in its own shops was announced in October, is now taking some of the steel. The St. Louis-Southwestern has received court permission to spend \$1,244,443 for cars, locomotives, rails and machinery; the Louisiana & Arkansas has ordered 275 flat cars; the United States Army will buy an indefinite number of tank cars, and a Brazilian railroad is inquiring in this country for 250 freight cars.

Long quiescent, the shipbuilding industry will enter upon a new era of activity next year with the awarding of 12 cargo ships by the Maritime Commission, on which bids have been requested by Feb. 1. These ships will take 55,300 tons of steel. Standard Oil tank ships, which may require as much as 20,000 tons of steel, may be awarded in January.

Structural steel lettings in the week were only 12,000 tons, of which 2560 tons is for the Bronx-Whitestone bridge, New York, and 2500 tons for altering the Detroit Baseball Club stadium. New projects out for bids include 2700 tons for a hospital in Pittsburgh, 2700 tons for a city hall in Houston, Tex., and 1200 tons for a power house at Lansing, Mich. About 10,000 tons of sheet piling will be required for the Delaware aqueduct, New York.

On the labor front, the action of the convention of the Steel Workers Organizing Committee in authorizing the union leaders to negotiate new wage contracts "without instructions" may be significant of a more conciliatory attitude on wages and other conditions. Negotiations for renewal of existing contracts are to be begun Feb. 7.



...PITTSBURGH...

...Ingot operations drop further owing to year-end influences.

• • •

...Finished steel specifications gain slightly with some companies.

• • •

...Consumers' stocks low; may mean better buying in January.

PITTSBURGH, Dec. 21.—Because of Christmas holiday shutdowns, steel output in the Pittsburgh district this week is estimated at 17 per cent of capacity, a drop of seven points from last week's level. The Wheeling-Weirton district is off 22 points to 22 per cent of capacity. Steel ingot output over the next few weeks will continue to reflect year-end influences. Some mills are using up supplies of raw steel before adding to steel-making operations.

Finished steel specifications during the past week have held up surprisingly well in view of the usual seasonal influences. Bookings so far this month at some plants are ahead of the corresponding November period or at least on a par. Some companies, however, are not doing this well and the aggregate picture will be somewhat affected during the remainder of the year.

The attempt to reduce inventories to a minimum by consumers continues. The existence of sub-normal supplies at some manufacturing plants is being taken by some producers as an indication toward better buying some time in January. No sharp increase in demand, however, is expected but a gradual improvement is anticipated.

Pig Iron

New business continues dull and not much change in the present picture is expected before the end of the year. Many manufacturing plants are sharply curtailing operations owing to seasonal influences and the current business outlook. Releases on commitments

are slow in materializing and in many cases will be carried into the next quarter.

Semi-Finished Steel

Total specifications so far this month are below those of the corresponding November period. Fresh orders are light. Export inquiry is slightly better, but foreign buyers are slow in closing.

Bars

Hot rolled bar sales during the past week have declined from those of the previous period. Current business is entirely composed of fill-in requirements and tonnages placed are exceptionally small. Some shipments have been deferred until after the first of the year. Not much change is expected in the bar market during the next few weeks owing to year-end influences.

Cold Finished Bars

Demand for cold finished bars is at low ebb and bookings are about on a par with tonnages placed during the past few weeks. Total specifications received so far this month are below those of the corresponding November period. Material scheduled for shipment to automotive manufacturers in some cases has been held up until after the first of the year.

Tubular Goods

Total business so far this month is not up to the volume placed during the corresponding November period. Pipe specifications are holding up relatively better than those for other products. Most orders, however, are for absolute

requirements as consumers are endeavoring to reduce inventories to a minimum.

Tin Plate

Current business continues dull. Specifications for advance rolling are not large. This condition is due to the fact that consumers have good stocks. Operations this week are off somewhat owing to holiday shutdowns.

Sheets

Miscellaneous demand is highly irregular and spotty with practically all consumers' expending every effort to reduce inventories. Total sheet business during the past week is about even with that of the previous period but orders so far this month are running below corresponding November specifications. In some cases shipments to automotive plants have been suspended until after the first of the year.

Wire

Orders for both manufacturers' and merchant wire products have eased off during the past week. Some manufacturing concerns curtailed operations and jobbers are only buying as actually needed. Numerous cases of jobbers' stocks being exceptionally low continue to appear.

Strip

Strip steel sales are no better than a week ago and, if anything, have declined slightly. Production is at a low point and many mills continue to find it necessary to shut down in order to accumulate enough orders to make a satisfactory schedule. Buying from automotive parts makers is practically non-existent and support from this source is not expected until after the first of the year. Miscellaneous purchasers are restricting their specifications to small fill-in requirements.

Plates & Shapes

Structural plate and shape specifications have shown a slight improvement during the past week. Both inquiries and awards compare favorably with recent activity. The rate at which new inquiries are being received by mills is surprising in view of the drop in demand for other steel products. A State hospital in Pittsburgh will take 2700 tons of material.

Reinforcing Bars

Mill specifications show little change from a week ago. The

A Comparison of Prices

Market Prices at Date, and One Week, One Month, and One Year Previous
Advances Over Past Week in Heavy Type. Declines in Italics

Rails and Semi-finished Steel

| | Dec. 21, 1937 | Dec. 14, 1937 | Nov. 23, 1937 | Dec. 21, 1936 |
|-------------------------------|---------------|---------------|---------------|---------------|
| Per Gross Ton: | | | | |
| Rails, heavy, at mill | \$42.50 | \$42.50 | \$42.50 | \$39.00 |
| Light rails, Pittsburgh | 43.00 | 43.00 | 43.00 | 35.00 |
| Rerolling billets, Pittsburgh | 37.00 | 37.00 | 37.00 | 32.00 |
| Sheet bars, Pittsburgh | 37.00 | 37.00 | 37.00 | 32.00 |
| Slabs, Pittsburgh | 37.00 | 37.00 | 37.00 | 32.00 |
| Forging billets, Pittsburgh | 43.00 | 43.00 | 43.00 | 39.00 |
| Wire rods, Nos. 4 and 5, P'gh | 47.00 | 47.00 | 47.00 | 43.00 |
| | Cents | Cents | Cents | Cents |
| Skelp, grvd. steel, P'gh, lb. | 2.10 | 2.10 | 2.10 | 1.80 |

Finished Steel

| | Per Lb.: | Cents | Cents | Cents | Cents |
|--|----------|--------|--------|--------|-------|
| Bars, Pittsburgh | 2.45 | 2.45 | 2.45 | 2.05 | |
| Bars, Chicago | 2.50 | 2.50 | 2.50 | 2.10 | |
| Bars, Cleveland | 2.50 | 2.50 | 2.50 | 2.10 | |
| Bars, New York | 2.79 | 2.79 | 2.79 | 2.40 | |
| Plates, Pittsburgh | 2.25 | 2.25 | 2.25 | 1.90 | |
| Plates, Chicago | 2.30 | 2.30 | 2.30 | 1.95 | |
| Plates, New York | 2.54 | 2.54 | 2.54 | 2.19 | |
| Structural shapes, Pittsburgh | 2.25 | 2.25 | 2.25 | 1.90 | |
| Structural shapes, Chicago | 2.30 | 2.30 | 2.30 | 1.95 | |
| Structural shapes, New York | 2.5125 | 2.5125 | 2.5125 | 2.161 | |
| Cold-finished bars, Pittsburgh | 2.90 | 2.90 | 2.90 | 2.35 | |
| Hot-rolled strips, Pittsburgh | 2.40 | 2.40 | 2.40 | 2.15 | |
| Cold-rolled strips, Pittsburgh | 3.20 | 3.20 | 3.20 | 2.85 | |
| Hot-rolled annealed sheets, No. 24, Pittsburgh | 3.15 | 3.15 | 3.15 | 2.80 | |
| Hot-rolled annealed sheets, No. 24, Gary | 3.25 | 3.25 | 3.25 | 2.90 | |
| Sheets, galv., No. 24, P'gh | 3.80 | 3.80 | 3.80 | 3.40 | |
| Sheets, galv., No. 24, Gary | 3.90 | 3.90 | 3.90 | 3.50 | |
| Hot-rolled sheets, No. 10, Pittsburgh | 2.40 | 2.40 | 2.40 | 2.15 | |
| Hot-rolled sheets, No. 10, Gary | 2.50 | 2.50 | 2.50 | 2.25 | |
| Cold-rolled sheets, No. 20, Pittsburgh | 3.55 | 3.55 | 3.55 | 3.25 | |
| Cold-rolled sheets, No. 20, Gary | 3.65 | 3.65 | 3.65 | 3.35 | |
| Wire nails, Pittsburgh | 2.75 | 2.75 | 2.75 | 2.25 | |
| Wire nails, Chicago dist. mill | 2.80 | 2.80 | 2.80 | 2.30 | |
| Plain wire, Pittsburgh | 2.90 | 2.90 | 2.90 | 2.60 | |
| Plain wire, Chicago dist. mill | 2.95 | 2.95 | 2.95 | 2.65 | |
| Barbed wire, galv., P'gh | 3.40 | 3.40 | 3.40 | 2.70 | |
| Barbed wire, galv., Chicago dist. mill | 3.45 | 3.45 | 3.45 | 2.75 | |
| Tin plate, 100-lb. box, P'gh | \$5.35 | \$5.35 | \$5.35 | \$5.25 | |

On export business there are frequent variations from the above prices. Also in domestic business, there is at times a range of prices on various products, as shown in our detailed price tables.

The Iron Age Composite Prices

Finished Steel

Dec. 21, 1937
One week ago
One month ago
One year ago

2.605c. a Lb.
2.605c.
2.605c.
2.274c.

Based on steel bars, beams, tank plates, wire, rails, black pipe, sheets and hot-rolled strip. These products represent 85 per cent of the United States output.

| | HIGH | LOW |
|------|------------------------------------|-----------------------------------|
| 1937 | 2.605c., Mar. 9; 2.330c., Mar. 2 | \$23.25, Mar. 9; \$20.25, Feb. 16 |
| 1936 | 2.330c., Dec. 28; 2.084c., Mar. 10 | 19.73, Nov. 24; 18.73, Aug. 11 |
| 1935 | 2.130c., Oct. 1; 2.124c., Jan. 8 | 18.84, Nov. 5; 17.53, May 14 |
| 1934 | 2.199c., Apr. 24; 2.008c., Jan. 2 | 17.90, May 1; 16.90, Jan. 27 |
| 1933 | 2.015c., Oct. 3; 1.867c., Apr. 18 | 16.90, Dec. 5; 13.56, Jan. 3 |
| 1932 | 1.977c., Oct. 4; 1.926c., Feb. 2 | 14.81, Jan. 5; 13.56, Dec. 6 |
| 1931 | 2.037c., Jan. 13; 1.945c., Dec. 29 | 15.90, Jan. 6; 14.79, Dec. 15 |
| 1930 | 2.273c., Jan. 7; 2.018c., Dec. 9 | 18.21, Jan. 7; 15.90, Dec. 16 |
| 1929 | 2.317c., Apr. 2; 2.273c., Oct. 29 | 18.71, May 14; 18.21, Dec. 17 |
| 1928 | 2.286c., Dec. 11; 2.217c., July 17 | 18.59, Nov. 27; 17.04, July 24 |
| 1927 | 2.402c., Jan. 4; 2.212c., Nov. 1 | 19.71, Jan. 4; 17.54, Nov. 1 |

Pig Iron

\$23.25 a Gross Ton
23.25
23.25
19.73

Based on average of basic iron at Valley furnace and foundry irons at Chicago, Philadelphia, Buffalo, Valley and Southern iron at Cincinnati.

| | HIGH | LOW |
|------|-----------------------------------|------------------------------------|
| 1937 | \$23.25, Mar. 9; \$20.25, Feb. 16 | \$21.92, Mar. 30; \$12.92, Nov. 16 |
| 1936 | 19.73, Nov. 24; 18.73, Aug. 11 | 17.75, Dec. 21; 12.67, June 9 |
| 1935 | 18.84, Nov. 5; 17.53, May 14 | 13.42, Dec. 10; 10.33, April 23 |
| 1934 | 17.90, May 1; 16.90, Jan. 27 | 13.00, Mar. 12; 9.50, Sept. 25 |
| 1933 | 16.90, Dec. 5; 13.56, Jan. 3 | 12.25, Aug. 8; 6.75, Jan. 3 |
| 1932 | 14.81, Jan. 5; 13.56, Dec. 6 | 8.50, Jan. 12; 6.43, July 5 |
| 1931 | 15.90, Jan. 6; 14.79, Dec. 15 | 11.33, Jan. 6; 8.50, Dec. 29 |
| 1930 | 18.21, Jan. 7; 15.90, Dec. 16 | 15.00, Feb. 18; 11.25, Dec. 9 |
| 1929 | 18.71, May 14; 18.21, Dec. 17 | 17.58, Jan. 29; 14.08, Dec. 3 |
| 1928 | 18.59, Nov. 27; 17.04, July 24 | 16.50, Dec. 31; 13.08, July 2 |
| 1927 | 19.71, Jan. 4; 17.54, Nov. 1 | 15.25, Jan. 11; 13.08, Nov. 22 |

Steel Scrap

\$13.58 a Gross Ton
13.42
12.92
17.75

Based on No. 1 heavy melting steel quotations at Pittsburgh, Philadelphia and Chicago.

number of projects coming out are not as numerous as several weeks ago but several large-sized jobs are still pending. Two flood control projects in western Pennsylvania will each take about 1300 tons of reinforcing bars. The general contract on one of them, Crooked Creek Dam near Ford City, Pa., will be let soon. George M. Brewster Co., Bogota, N. J., is low bidder.



Baltimore plans pipe lines for water system in Twenty-fifth Street, Caton Avenue and other thoroughfares; also lines for storm sewer system. Fund of \$30,000 has been secured through Federal aid.

St. Charles, Mich., plans pipe lines for water system and other waterworks installation. Cost about \$40,000. Francis Engineering Co., Saginaw, Mich., is consulting engineer.

Webster, N. Y., plans pipe lines for water system in Forest Lawn district. Cost over \$50,000. Financing will be arranged through Federal aid.

Holdenville, Okla., plans pipe lines for extensions in water system and other waterworks installation. Cost about \$70,000. A bond issue in that amount is being arranged.

Broadmoor Hotel, Inc., Colorado Springs, Colo., Spencer Penrose, president, plans about five miles through mountain district to Will Rogers Shrine of Sun on Cheyenne Mountain, for water supply at latter point. Work is scheduled to begin early next year. Milton J. Strong, first noted address, is construction superintendent in charge.

Ephrata, Wash., plans pipe lines for water system; also sewage system and sewage disposal works. Parker & Hill, Smith Tower Building, Seattle, are consulting engineers.

Monroe, Wash., plans pipe lines for water system and other waterworks installation. Cost about \$35,000. Bond issue will be arranged in that amount, with special election to be held soon. Parker & Hill, Smith Tower Building, Seattle, are consulting engineers.

Prentiss, Miss., will ask bids soon for about 8000 ft. of various sizes for water system. J. C. Sanford, Marshall, Miss., is engineer.

Olympic View Water District, Olympic View, Wash., plans pipe lines for water system and other waterworks installation. Cost about \$40,000. C. H. Glover, Court House, Everett, Wash., is engineer.

Aurora Country Club, Aurora, Ill., plans pipe lines for underground water system. Cost about \$25,000. It is proposed to begin work next spring.

Red Oak, Iowa, plans 11,500 ft. of 2 to 10-in. for water system, replacing present mains. Financing is being arranged through Federal aid. Arthur E. J. Johnson is city clerk in charge.

Rye, Colo., plans about 11,000 ft. of various sizes for water system. Cost about \$25,000. Financing is being arranged in part through Federal aid.

Colchester, Conn., plans pipe lines for water system; also storage tank, pumping machinery and other waterworks equipment. Cost about \$100,000, of which \$40,000 will be secured through Federal grant. H. W. Buck, 650 Main Street, Hartford, Conn., is consulting engineer.

Elgin, Ore., asks bids Dec. 29 for waterworks improvements, comprising extension of present supply line, concrete and earth-rock fill intake dam, grit chamber, pipe line to storage reservoir, and 150,000-gal. reinforced concrete reservoir. Cost about \$16,320.

Preston, Idaho, has called for bids for waterworks system to cost \$110,000. R. G. Harding, Salt Lake City, Utah, is consulting engineer.

Seattle, Wash., will open bids Dec. 27 for 42,808 ft. of water pipe; alternate bids on electrically welded steel pipe, high-strength cast iron pipe, centrifugal cast iron pipe, and sand cast iron pipe.

La Mesa, Lemon Grove, and Spring Valley Irrigation District, La Mesa, Calif., has awarded, subject to PWA approval, 939 tons of 4, 6, 8, and 12-in. pipe to United States Pipe & Foundry Co., San Francisco.

Seattle, Wash., has awarded 1150 tons of centrifugal cast iron pipe to be used in Ninth Avenue mains to United States Pipe & Foundry Co., San Francisco.

Vancouver, Wash., has awarded 400 tons of 6 to 16-in. pipe to United States Pipe & Foundry Co., San Francisco.

Long Beach, Cal., will call for bids Jan. 4 on 5672 ft. of 6-in. and 513 ft. of 8-in. pipe.

Spokane, Wash., has opened bids on 1800 ft. of 12-in. and 6000 ft. of 6-in. pipe.



... Missouri Pacific buys 900 tons of rails.

ST. LOUIS, Dec. 21.—The Missouri Pacific Railway has bought 900 tons of 131-lb. rails from the Carnegie-Illinois Steel Corp. for emergency laying on a four-mile stretch in Arkansas.

St. Louis Southwestern Railway has been authorized by the Federal Court to expend \$1,244,443 for improvements during 1938. Road improvements include: relaying tracks with heavier rails, \$3,542; tie plates and rail anchors, \$68,845; shops and engine houses, \$119,023; roadway machines, \$15,967; signals and interlocking equipment, \$18,072; shop machinery, \$93,132; power plant machinery, \$15,485; locomotives, \$40,336; freight cars, \$295,100; passenger cars, \$130,000, and work cars, \$8,778.

Walsh & Wells, St. Louis; Nolen Construction Co., Detroit, and Schevenell Construction Co., Mem-

phis, are low bidders on each of three sections of a sewer project at Memphis, requiring 1000 tons of reinforcing bars.

Buying of finished steel continues at a low rate, and mills expect no buying of consequence until after the turn of the year.

There was no buying of pig iron—either for spot or future delivery—during the past week, and there are no inquiries pending. With steel mills closing down until after Jan. 1, the melt is at the lowest point of the year. Stove foundries, too, are down, and besides find themselves with large stocks of finished product.

Machinery Men Hit Anti-Saving Policy

BUSINESS buying must be encouraged if payrolls and consumer purchasing power is to increase, William J. Kelly, president of Machinery Institute, said last week at Chicago with release of the institute's report on "Savings and American Progress."

"National policies which discourage the accumulation of capital for launching new industries and improving and expanding old ones are largely responsible for the halting pace in the revival of consumer purchasing power," Mr. Kelly said.

The institute concluded that the undistributed profits tax and phases of the administration of the Securities Exchange Act have discouraged investment in capital equipment, that American industry has no great excessive capacity, and that the Government anti-saving policies are curbing activities in the durable goods industries—iron and steel, machinery and equipment manufacture and building construction—on which American progress depends.

A.S.T.M. Issues New Refractory Manual

THE American Society for Testing Materials has published a new edition of its refractory manual which, in addition to containing all refractory standards and detailed methods for interpreting test data, includes for the first time a section devoted to the recommended procedure for calculating heat losses through furnace walls. Copies of the manual may be secured from the society's office at 260 South Broad Street, Philadelphia, at a cost of \$1.25 per copy.



CHICAGO

... One steel producer increases output, offsetting losses elsewhere.

... Important seller reports best volume of orders since September.

... Western roads to buy 150,000 to 200,000 tons of rails if rate increase is granted.

CHICAGO, Dec. 20.—An increase in operations by a large producer in this district almost entirely offset the reductions because of the Christmas Day shutdown, a loss of only one-half point being sustained, the district operating at 23½ per cent of capacity. Pig iron production is unchanged, 14 blast furnaces continuing.

Sentiment is decidedly improved, one important seller announcing the best sales since the week of Sept. 24, and the best specifications since the week of Oct. 7. Although it is true that these increases were mostly caused by a few large orders, it is business nevertheless and accordingly significant. Miscellaneous inquiries are better in volume and tonnage.

Operations continue good among the makers of farm implements and tractors, although, in order not to lay off any employees, the International Harvester Co. last week was forced to a four-day week. This reduction, however, according to company officials, is in line with the usual normal reduction in business at this time, this being the industry's slack season, and by spring all departments are expected to be back on a five-day week. Only certain lines of implements are affected by this reduction.

Steel sellers here are of the opinion that the labor situation in Detroit is having as much to do with the current inactivity of automobile companies as concerns the purchase of steel as any other factor.

Several Western railroads are understood to be ready to purchase from 150,000 to 200,000 tons of rails when and if they are granted the freight rate increase now being sought in Washington. In the past week upward of 15,000 tons of

track accessories has been placed in this district. Some steel is also being ordered from time to time for car repairs, although this volume at the moment is insignificant.

The Burlington's program of 1250 cars, which was announced in October, is being carried out now, and 20,000 to 25,000 tons of steel will be necessary for this construction. Some of this tonnage is being released now but a considerable tonnage was ordered some time ago.

Around Jan. 1 the Elwood, Ind., works of Carnegie-Illinois Steel Corp. will be closed, and the future operation of the plant will depend upon business conditions.

Pig Iron

Although production of steel-making and merchant iron remains the same this week, 14 furnaces being in blast throughout the district, shipments show no improvement, sellers reporting a 40 to 50 per cent drop from last month. Several jobbing foundries are expected to close down this week until after the first of the year, ostensibly for inventory periods, but actually because of a dearth of orders. Most of the production foundries will continue current operations.

Bars

Farm equipment specifications, some buying for automobile manufacturing purposes, and the usual general demand are the chief supporting influences in this market, with implement orders perhaps being most important. Deliveries range from prompt to two and three weeks.

Reinforcing Bars

A number of projects which aggregate a good tonnage are still

pending. The only award of consequence is 300 tons to the Sheffield Steel Corp. for a Springfield, Ill., power plant. It is still too early to report the results of the recent price changes affecting rail and billet bars.

Structural Shapes

The only important award to be reported recently was 900 tons to Mississippi Valley Structural Steel Co. for a Springfield, Ill., power plant. Some general contracts have been awarded for school construction in this area, but as yet no steel has been bought. The threat of a reduction in PWA funds next year is understood to have stimulated this work.

Sheets

Little change is noticeable in the market for sheets here, deliveries remaining at two to three weeks for cold rolled and hot rolled annealed material. Some orders are coming in from the stove and refrigerator manufacturers, as well as from general sources. Automobile demand is unchanged.



... Awards of 1700 tons
—10,800 tons in new
projects.

AWARDS

Hartford, Conn., 200 tons, Fox department store, to Truscon Steel Co., Youngstown.

New York, 175 tons, Treasury Department, Procurement Division, to W. Ames & Co., Jersey City.

Queens, N. Y., 313 tons, lift bridge and grade elimination for Bronx-Whitestone bridge, to Joseph T. Ryerson & Son, Inc., Jersey City.

Polk, Pa., 130 tons, State school, to McCloskey Co., Philadelphia.

Norristown, Pa., 300 tons, State hospital ward buildings, to Sweets Steel Co., Williamsport, Pa.

Springfield, Ill., 300 tons, power plant, to Sheffield Steel Corp., Kansas City, Mo.

Livingston, Cal., 128 tons, State underpass, to Ceco Steel Products Corp., San Francisco.

Selma, Cal., 128 tons, two schools, to Kyle Steel Construction Co., Los Angeles.

NEW REINFORCING BAR PROJECTS

North Providence, R. I., 114 tons of steel joists, high school.

New York, 150 tons, Canal Street post office, J. Weinstein & Rubin Building Corp., general contractor.

New York, 140 tons, roadway and underpass, Exterior Avenue and East 138th Street, in Bronx; bids Dec. 23.

College Point, N. Y., 600 tons, sewage plant.

Weehawken, N. J., 925 tons, contract MHT-71, approach and ramp, Lincoln Tunnel, George M. Brewster Co., Bogota, N. J., low bidder.

Farrell, Pa., 217 tons, 140 tons joists, and 77 tons of bars for high school. Charles Shutrum & Sons, Youngstown, contractors.

Memphis, Tenn., 1000 tons, sewer project; bids in.

Lynbrook, N. Y., 1200 tons, grade elimination for Pennsylvania Railroad.

Hancock, Md., 650 tons, bridge.

Detroit, 370 tons, sewage disposal system, tanks, gas holder.

Detroit, 100 tons, Schmidt Brewery.

East Lansing, Mich., 150 tons, school.

Cleveland, 300 tons, Nottingham Reservoir for Cleveland Waterworks Department; bids taken.

Oak Park, Ill., 200 tons, building.

Chicago, 652 tons, addition to A. T. Galt merchandise building, reported as 500 tons previously.

Dinuba, Cal., 228 tons, two schools; Richmond Construction Co., San Francisco, low bidder on general contract.

National City, Cal., 100 tons, Sweetwater River highway bridge; bids Jan. 7.

Los Angeles, 4195 tons, for United States Engineer; bids opened.

Redding, Cal., 200 tons, State undercrossing, to Ingalls Iron Works Co., Birmingham.

Arlington, Ore., 200 tons, Kimberly bridge, to Poole & McGonigle, Portland, Ore.

Astoria, Wash., 240 tons, State bridge over Gray River, to Poole & McGonigle, Portland, Ore.

Skykomish, Wash., 290 tons, State bridge over Skykomish River, to Pacific Car & Foundry Co., Seattle.

State of Washington, 250 tons, Yakima Ridge Canal bridges, to Midwest Steel & Iron Works, Denver.

NEW STRUCTURAL STEEL PROJECTS NORTH ATLANTIC STATES

New York, 750 tons, 14 story apartment building, 20th Street and Seventh Avenue.

New York, unstated tonnage, public schools No. 118 and 124 in Bronx; bids close Dec. 29.

New York, 315 tons, roadway and underpass, Exterior Street and East 138th Street, in Bronx; bids Dec. 28.

Queens, N. Y., unstated tonnage, public school No. 10; bids close Dec. 29.

Glen Cove, N. Y., 230 tons, high school.

Richfield Springs, N. Y., 180 tons, public school.

Pittsburgh, 2700 tons, Psychiatric Hospital, General State Authority.

Washington, 115 tons, theater and store building, F. S. Kogod & M. Burka.

Trenton, N. J., 400 tons, Montgomery Ward building.

THE SOUTH

Houston, Tex., 2700 tons, City Hall.

Fabens, Tex., 125 tons, bridge over Rio Grande River, International Boundary Commission.

CENTRAL STATES

McGonigle, Ohio, 150 tons, State railroad bridge, to Bethlehem Steel Co., Bethlehem, Pa.

Detroit, 2500 tons, stadium alterations, Detroit Baseball Club, to Whitehead & Kales, Detroit.

Willmar, Minn., 150 tons, State highway bridge, to Bethlehem Steel Co., Bethlehem, Pa.

Springfield, Ill., 900 tons, power plant, to Mississippi Valley Structural Steel Co., St. Louis.

Corydon, Ind., 204 tons, to Midland Structural Steel Co., Cicero, Ill.

Racine, Wis., 125 tons, Western Printing & Lithographing Co. building, to Bethlehem Fabricators, Inc., Bethlehem, Pa.

Dodge County, Neb., 185 tons, bridge, to Illinois Steel Bridge Co., Jacksonville, Ill.

Racine, Wis., 375 tons, J. I. Case shop, to Lakeside Bridge & Steel Co., Milwaukee.

WESTERN STATES

Livingston, Cal., 108 tons, State underpass, to Coco Steel Products Corp., San Francisco.

Los Angeles, 133 tons, Geneva Street bridge, to Consolidated Steel Corp., Los Angeles.

Los Angeles, 115 tons, Test Brand Boulevard bridge, to Consolidated Steel Corp., Los Angeles.

Los Angeles, unstated tonnage, tunnel ribs for Department of Water and Power, to Bethlehem Steel Co., San Francisco.

Los Angeles, 270 tons, Verdugo Wash bridge floor system, to Consolidated Steel Corp.

Los Angeles, 250 tons, Duquesne Avenue crossing, to Wisconsin Bridge & Iron Co., Milwaukee.

Seminole Dam, Wyo., 138 tons, three fixed wheel gates for spillway (Spec. 990-D); Phillips & Davies, Kenton, Ohio, low bidders.

Sanger, Cal., 108 tons, highway bridge; bids Jan. 5.

Los Angeles, 225 tons, Centinela Avenue bridge for United States Engineer; bids Dec. 23.

Los Angeles, 149 tons, Opechee Way and Wabasso Way bridges; bids opened.

Odair, Wash., 300 tons, bulkhead gate frame, etc., Specification 764, Bureau of Reclamation.

Compton, Cal., 235 tons, Pacific Electric Railway bridge.

FABRICATED PLATES

AWARDS

New York, 185 tons, caissons, Lincoln Tunnel, to Petroleum Iron Works Co. of Texas, New York.

Kansas City, Mo., 880 tons, four river barges, Socony Vacuum Oil Co., to St. Louis Shipbuilding Co., St. Louis.

Fort Peck, Mont., 1049 tons, 28-in. pipe, to Treadwell Construction Co., Midland, Pa.

SHEET PILING

NEW PROJECTS

Westchester and Putnam Counties, N. Y., 10,000 tons, estimated tonnage, Delaware River aqueduct project.

... Lettings decline to 12,100 tons from 25,250 tons last week.

o o o

... New projects also lower at 10,325 tons as against 24,650 tons a week ago.

o o o

... Plate awards call for 2115 tons.

NORTH ATLANTIC STATES

Storrs, Conn., 210 tons, college library, to Berlin Construction Co., Berlin, Conn.

Bridgeport, Conn., 200 tons, Southern New England telephone garage, to American Bridge Co., Pittsburgh.

New York, 475 tons, public school No. 119 in Bronx, to Lehigh Structural Steel Co., Allentown, Pa.

New York, 210 tons, New York Central Railroad warehouse, 401 West 30th Street, to Harris Structural Steel Co., Plainfield, N. J.

Queens, N. Y., 2560 tons, lift bridge and grade elimination for Bronx-Whitestone bridge, to Bethlehem Steel Co., Bethlehem, Pa.

Brooklyn, 150 tons, J. Eichler Brewing Co. building, to Voepel Sons, Inc., New York.

Queens, N. Y., 225 tons, public school No. 134, to Bethlehem Fabricators, Inc., Bethlehem, Pa.

Hartsdale, N. Y., 170 tons, school, to Ingalls Iron Works Co., Birmingham.

Wyoming, N. Y., 135 tons, central school, to Ernst Iron Works, Buffalo.

Elba, N. Y., 195 tons, central school, to Ernst Iron Works, Buffalo.

Alexander, N. Y., 180 tons, school, to Bethlehem Steel Co., Buffalo.

Batavia, N. Y., 100 tons, hospital addition, to Bethlehem Steel Co., Buffalo.

Lackawanna, N. Y., 140 tons, school, to Buffalo Structural Steel Co., Buffalo.

Girardville, Pa., 125 tons, high school, to Truscon Steel Co., Youngstown, Ohio.

Farrell, Pa., 315 tons, high school, to Flemming Structural Steel Co., New Castle, Pa.



... CLEVELAND ...

... Ingot output lowered sharply in Ohio districts.

• • •

... Buying improvement in January.

• • •

... Automotive orders for steel are small.

CLEVELAND, Dec. 21.—Owing to the holiday shutdown, with some producers suspending operations both Friday and Saturday, ingot output in the Cleveland-Lorain district will be down 10 points to 17 per cent of capacity this week. In the Youngstown district operations will be off 6 points to 21 per cent of capacity.

Improvement has been shown in bookings for sheets, owing to the low level of some consumers' stocks. In most other products, however, incoming orders and shipments so far this month are lagging behind the volume in the corresponding period of November.

Very little increase in buying is expected over the remainder of the month, but activity will be slightly better in the early part of January. Many consumers have deliberately held back to reduce their inventories to a minimum at the close of the year. In most products, releases now are held by mills for shipment during the first week of January.

Buying by the automotive industry continues slack, and hold-up instructions have been received on some of the orders placed earlier this month. Willys-Overland at Toledo has closed its plant until an indefinite date in January. Operations of parts makers and foundries are reduced.

Railroads in this district are still out of the market, their normal inquiries for spring requirements now overdue. Apparently no action can be expected until March or April upon the request for a freight rate increase. Despite talk of a possible revision in the jobber-dealer setup upon merchant wire items, no change is contemplated at this time.

For the third week scrap quota-

tions are unchanged in both the Cleveland and Youngstown districts.

Bars, Plates and Shapes

Mills are getting quite a number of orders for merchant bars but all are for small lots. The volume of business is about the same as in November, although shipments are much lighter than last month. Small-lot orders for plates for tank work have improved. Activity in the construction field continues very light. New bids for the Cuyahoga Heights School, Cleveland, requiring 310 tons, will be taken Jan. 17. Reinforcing bars are firmer following the recent reduction in the established distributors' price. Cleveland took bids Dec. 17 for 300 tons and all bidders quoted the present published price.

Iron Ore

Consumption of Lake Superior ore during November, with numerous furnaces going out of blast, was 2,734,504 tons. This was a decrease from October of 1,469,369 tons, and compared with 4,269,049 tons consumed in November last year.

Pig Iron

Shipments have declined to a low point and producers do not look for any additional shipping orders during December. Some have revised earlier estimates of shipments for this month which will be barely more than half the amount shipped in November. With slack business, many foundries have already shut down until after the holidays and others will suspend during the current week. Some of the cast iron pipe foundries in the South that are usually operating at this time of the year

to build up stocks have shut down. Melters are reducing stocks as much as possible and most will have low inventories on Jan. 1. However, many will start the new year with considerable iron due on old contracts.

Sheets & Strip

Demand for sheets improved in this district during the past week, some consumers having reached the point where their inventories were exhausted. Incoming orders have been moderate from the tonnage standpoint and have been from diversified sources. Some working down of inventories and cutting up of stock is still in progress. Both in sheets and cold rolled strip automotive specifications continue light.

Wire

Specifications for wire products are slightly better, but the improvement to date has not been sufficient to boost the December volume over the corresponding November period. With jobber inventories lower, a number of replacement orders have been booked by producers, principally for shipment early in January. No change is contemplated at this time in the jobber-dealer merchandising plan on merchant wire items. Discussion concerning a possible revision of the maximum discount had arisen in some quarters.



... Pig iron business is almost nil.

BOSTON, Dec. 21.—There were no orders or inquiries for pig iron in the past week and only a few cars were shipped against contracts. It is believed that some buying will develop as soon as inventories have been completed early next month. The New England melt is running between 30 and 35 per cent of rated capacity, with indications that it may drop lower before the end of the year.

Some round tonnages of fabricated structural steel are hanging over the market, but actual awards are at the low point of the year. More than 1000 tons of reinforcing bars have been booked in the past week.



...Cast iron pipe awards total 2500 tons.

SAN FRANCISCO, Dec. 20.—Cast iron pipe awards totaling 2500 tons and new projects which will require approximately 2000 tons furnished the only ripple in an otherwise becalmed market. Waterworks development in the Pacific Northwest accounted for the greater part of this tonnage.

The contract for supplying tunnel ribs to the Department of Water and Power, Los Angeles, over a 12-month period went to the Bethlehem Steel Co. at \$85,440. The U. S. Engineer, Los Angeles, has opened bids on 4193 tons of reinforcing bars. This office placed 248 tons for two bridges with Consolidated Steel Corp., Los Angeles, announced Wisconsin Bridge & Iron Works, Milwaukee, as low bidder on 158 tons for a third bridge; and called for bids on 374 tons for three other bridges.

Contract for furnishing fish lift operating machinery for Bonneville Dam, Ore., was awarded by the U. S. Engineer as follows: Schedules 1 and 3 to General Iron and Steel Works, Portland, Ore., \$117,780; schedule 2 to Lakeside Bridge & Steel Co., Milwaukee, \$20,137.

The San Francisco Bay Exposition, San Francisco, asks bids Dec. 30 on 523 tons steel pipe and fittings for a water distribution system and an additional tonnage for a gas distribution system for the 1939 World's Fair grounds.



...Dominion steel industry optimistic.

TORONTO, Dec. 21.—While current demand for iron and steel materials is slow, the industry is optimistic for the future and looks for a speeding up of sales immediately after the turn of the year. In the meantime plant operations

show only moderate reduction for the holiday season, and most companies report good backlog. An indication of the feeling among Canadian steel officials is revealed in the statement by Victor M. Drury, president of Canadian Car & Foundry Co., as follows: "Orders for airplanes and airplane equipment now amount to over \$2,150,000 and are all for foreign governments, with full payment for same either made by cash in advance or satisfactory letters of credit on Canadian or United States banks. While the railroads have not given out additional orders for cars in connection with their five-year program, the company is hopeful that these will be forthcoming at an early date."

With the exception of a general downward revision in scrap prices, no changes have been announced in iron and steel quotations.

Pig iron melters are endeavoring to hold inventories down during stock taking which is affecting current sales. Inquiries have dried up.

Scrap dealers have reduced prices from \$1 to \$2 per ton and state that while there is a fair demand for cast scrap, stove plate, wrought scrap and heavy melting steel, other lines are moving slowly.



...Further reduction in open-hearth operations.

BUFFALO, Dec. 21.—Steel and iron business has now slowed down to almost minimum tempo. Pig iron interests report the foundry market spotty with only intermittent operation in most lines. One bright spot in the picture is the continuing demand from makers of agricultural implements which seem to have been less affected by the recession than other classes of foundries. Most makers of plows and harvesting machinery are going along on schedule and turning out finished product.

Operations of Buffalo mills were slowed still further during the week when Republic Steel Corp. took two open hearths out of production, cutting operations to one furnace. Bethlehem's Lackawanna plant continued to operate six. These were the only active open

hearts in the district. Pig iron furnaces maintained previous schedules.

A Buffalo concern will fabricate 100 tons of structural steel for a boys' dormitory in a Batavia hospital and 180 tons for a school at Alexander, N. Y. Another Buffalo fabricator has the contract for 140 tons for a school in Lackawanna.

Warehouse business is slow, with sales figures so far below those of November.



CINCINNATI, Dec. 21.—A flurry of early shipment orders for sheets the past week indicated that consumers are not over-supplied with material and any general business improvement will be felt almost immediately in heavier steel tonnage.

Mills are operating at 25 to 30 per cent of capacity. Finishing operations are being staggered.

Open-hearth operations were increased the past week to about 30 per cent. This rate will not be maintained during the present week.

While a few small first quarter inquiries have developed, the pig iron market is quiet. The melt is relatively unchanged from last week.



...Steel and pig iron business very light.

BIRMINGHAM, Dec. 21.—General steel business is still very light. Rail tonnage recently booked is the principal sustaining factor in mill operations. However, there have been some good releases of structural steel against contracts.

There is little interest among pig iron melters in first quarter coverage. Not much business is expected until after the first of the year.

Nine open hearths and 13 blast furnaces are operating this week.



...NEW YORK. . . .

... Business light but running ahead of November.

... Moderate improvement expected after end of the year.

... Delaware River aqueduct calls for 10,000 tons of piling.

NEW YORK, Dec. 21.—Nearly all steel companies represented in this district have experienced a very moderate improvement in orders during the past week. However, the total tonnage booked was so small in comparison with normal requirements of the district that district sales managers have not attempted to draw any conclusions as to whether this is the beginning of a gradual gain that might be accelerated after the first of the year.

The New York district depends largely for its steel business on a few major outlets, the most important of which are building construction, the railroads, can manufacturers and jobbers. Building activity, though below normal even for this usually dull period of the year, stands out by reason of the almost complete absence of buying by the other groups. Railroads are taking virtually nothing, the can manufacturers are so well supplied with tin plate that January and February releases may be below normal, and jobbers are buying only small fill-in lots. Nevertheless there are surface indications that orders will flow a bit more freely after the end of the year, though the improvement may be meager during January at least. One important company states that its total tonnage thus far in December is about 15 per cent larger than during the corresponding period of November.

One of the largest inquiries before the trade is for 10,000 tons of sheet piling for a section of the Delaware River aqueduct.

Pig Iron

Some sellers in this district report a slight improvement in the

number of orders booked during the past week. These orders, however, are for small fill-in tonnages calling for early January shipment. Market sentiment places March as the earliest date on which any sizable buying can be expected. Deliveries on fourth-quarter contracts are fairly well completed, and carryover tonnages are the lowest of the past five years. New export inquiry is very small. A few small lots, between 50 and 200 tons, for shipment abroad were placed during the week. Japanese interests are considering the purchase of 25,000 tons of Southern iron.

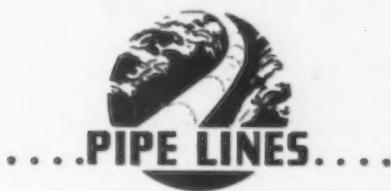
Reinforcing Bars

Demand for reinforcing concrete bars has fallen to the year's lowest level and severe price competition is developing. Quotations on recent Government contracts ranged from \$10 to \$13 per ton below the published resale price. Tonnages pending on larger jobs at present total about 2600 tons and includes three new inquiries of 600 tons for a sewage plant in Queens, 140 tons for a grade elimination project in the Bronx and 925 tons for the Jersey approach to the Lincoln Tunnel. Also pending are a number of small road jobs on which awards have been held up by contractors seeking more advantageous prices.

Plates and Sheets

December sheet volume is somewhat above that of November for like period, although the last week was an exceedingly dull one for several sellers in this district. On the other hand, one of the smaller independents reported upward of five carloads sold during the past

week, including two cars of galvanneal for shipment in early January to a manufacturer. Jobbing trade is still very light and no one looks to any substantial activity on the part of either jobbers or manufacturers until after the inventory period.



Lone Star Gas Corp., 1915 Wood Street, Dallas, Tex., has authorized new 18-in. welded steel pipe line from gas field at Buffalo, Leon County, Tex., to connection with present system, about 19 miles, for natural gas transmission. Right-of-way will be cleared at once. Compressor stations will be installed for booster service. Cost over \$125,000.

United States Engineer Office, Fort Peck, Mont., asks bids until Dec. 28 for eight pieces of 28-in. i.d. steel dredge pipe, with 1-in. wall thickness, each piece 20 ft. long, plain ends (Circular 177).

Texhoma, Okla., has plans for pipe line system for natural gas distribution, with main welded steel pipe line for connection with pipe line supply source and control station in municipality. Cost about \$30,000. Frank E. Devlin, W-K-H Building, Wichita, Kan., is consulting engineer.

Chattanooga Gas Co., Chattanooga, Tenn., has arranged with Southern Natural Gas Co., with main gas transmission line extending to Rome, Ga., for natural gas supply for local distribution and is concluding negotiations with City Council for an additional 40-year gas franchise. Main welded steel pipe line will be built for connection with Southern system for trunk line service, with extensions in pipe line system in city and suburban areas, including control stations and other operating facilities. Cost about \$1,500,000, of which close to \$500,000 will be used for pipe lines and other work in city district.

Barnsdall Oil Co., Tulsa, Okla., has awarded contract to White Deer Pipe Line Co., 1142 South Twenty-ninth Street, Oklahoma City, Okla., for pipe line gathering system in Odessa, Tex., oil field, comprising about 30 miles of 2 to 12-in. steel pipe. Cost close to \$60,000.

Rockport, Tex., has low bid from Gayle Brothers, 808 Blodgett Street, Houston, Tex., for pipe line system for gas transmission; also for cast iron pipe lines for water system, including elevated steel tank and tower, and other equipment. Southwest Engineering Co., Littlefield Building, Austin, Tex., is consulting engineer.

Macon Gas Co., Macon, Ga., plans extensions in pipe lines in Burton Avenue, from Log Cabin Boulevard to Columbus Road, for natural gas distribution.

Toledo, Ohio, has let contract to Yunker & Wiecks, 2223 N.E. Fifty-first Street, Portland, for pipe lines for water system, including 7000 ft. of 10-in. steel pipe for main supply line from Siletz River, at \$94,324. Beasley & Stoehr, Railway Exchange Building, Portland, are consulting engineers.

San Francisco Bay Exposition, San Francisco, asks bids Dec. 30 on 523 tons of steel pipe and fittings for a water distribution system for 1939 World's Fair grounds; also for a gas distribution system.

Bureau of Reclamation, Denver, asks bids Jan. 4 for two welded steel outlet pipes for outlet works at Boca Dam, Cal.-Nev.



• • PHILADELPHIA • •

... District operations down to 25 per cent.

• • •

... Buying lags as holidays approach.

• • •

... Plate prospects appear brighter.

PHILADELPHIA, Dec. 23.—Following usual practice, certain local mills are taking off open hearths to facilitate the carrying out of year-end repairs. The result has been a five-point decline in the aggregate district rate, which for the current week averages in the neighborhood of 25 per cent of capacity. A few other minor declines are looked for next week.

Buying interest is totally lacking at the moment, as had been expected. Consumers will undoubtedly drift through the holiday periods without taking on additional commitments, but numerous conversations with principal users have disclosed an intention of buying more heavily fairly early in January, although there is little doubt that this activity will be marked by extreme caution for some time.

Pig Iron

Japan, which has been out of the iron and scrap markets for many months, last week again showed a spark of interest, which was soon translated into a 25,000-ton order with a southern furnace. That additional purchases of iron and scrap will be forthcoming is very likely, although actual commitments will probably not be made until late January or early February. In the Philadelphia area iron buyers continue to avoid all action, and sellers will probably enter the new year with very little tonnage on their books. Even though pig iron consumers have suffered from the business decline, it is apparent that stocks have been and are being reduced to a very low level, and will necessarily have to be rebuilt in the near future, probably not until general sentiment improves in the new year or until all pos-

sibilities of price reductions are discarded.

Warehouse Business

Turnover has changed little over the past six weeks, and in volume is now running about 30 per cent under that of the summer months. All warehouses here have kept their stocks at quite a high level, indicating they expect no significant change in mill prices. The local price list is unaltered, but lower mill prices on reinforcing bars may soon be reflected in a change in warehouse quotations here. The general expectation is that bookings will lag throughout January, after which a slowly improving situation is expected to ensue.

Sheets and Strip

The week has witnessed a better flow of orders for first quarter delivery, but spot business is very slack and several local mills have almost ceased operating. The current recession is remarkable in that rumors of price concessions have been very scarce, and no amount of investigation has disclosed the slightest weakness in bids on the scattered amount of business that is drifting into the market. No maker here expects a sharp recovery immediately after the first of the year, but rather a prevailing soft condition for at least two or three weeks which will be followed by a generally improving demand.

Shapes and Plates

Day-to-day turnover in plates is very light, and local mills have contracted operations drastically. However, the outlook over the next year is fairly encouraging in view of the large amount of ship work which has been awarded or will come up for bidding. This work

will probably account for 150,000 to 200,000 tons of plates, to be supplied primarily from this and the Pittsburgh districts, although deliveries will be extended over several years. Pusey & Jones, Wilmington, is low bidder on a Government dredge, which will require 2600 tons of steel. New York Ship will soon release the preliminary steel required by two Government tenders, a number of Standard Oil tankers will probably soon be awarded to a local yard, and it appears that several more battleships may go to nearby yards in the new year. Shapes and bars are at the moment not very active, but the outlook has improved somewhat due to the rapid release of State work. Within the next two weeks about 6000 tons of shapes and about 2000 tons of bars will be released. Prices on this material have been beaten down to a fairly low level, with competition very keen on all new projects.



Mexican Railway has ordered three locomotives from Montreal Locomotive Works, Ltd.

Louisiana & Arkansas has placed an order for 275 flat cars with American Car & Foundry Co.

United States Army is asking bids on an indefinite number of 10,000-gal. tank cars.

Paulista Railway of Brazil is inquiring for 250 freight cars and 95 underframes.

St. Louis-Southwestern has been authorized to expend \$1,244,443 for improvements, including locomotives, \$40,336; freight cars, \$295,100; passenger cars, \$130,000, work cars, \$8,778, and \$9,132 for shop machinery.

American Car & Foundry Motors Co. has received an additional order from Santa Fe Trail Transportation Co. for 45 36-passenger parlor coaches.

New freight cars on order Dec. 1, this year, totaled 12,566 compared with 18,305 on Nov. 1, 1937, and 19,844 on Dec. 1, 1936, according to the Association of American Railroads. New steam locomotives on order on Dec. 1, this year, totaled 156 compared with 111 on the same day in 1936. New electric and diesel locomotives on order totaled 40 compared with five last year. Class I railroads in the first 11 months, this year, installed in service 70,168 new freight cars compared with 39,556 in the same period last year and 6754 two years ago. In the 11 months' period this year, 342 new steam locomotives were put in service compared with 77 in the same period last year and 31 in the same period in 1935. New electric and diesel locomotives installed in the first 11 months of 1937 totaled 59.

RAILS AND TRACK SUPPLIES

Missouri Pacific has purchased 900 tons of 131-lb. rails from Carnegie-Illinois Steel Corp.

St. Louis-Southwestern has been authorized to expend \$1,244,443 for improvements during 1938, including relaying tracks with heavier rails, \$3,542; tie plates and rail anchors, \$68,845.



NON-FERROUS

... Copper prices down 1/8c.; tin lower.

• • •

... Lead quotations cut \$5 per ton.

NEW YORK, Dec. 20.—Immediately following the publication of the domestic statistics for November, which showed a heavy advance in stocks and a sharp recession in deliveries, smelter interests lowered quotations on electrolytic copper to

10.125c. per lb., Connecticut Valley. Producers' prices were unaffected and remain at the 11c. level. Market inquiry at the new price level continues light, with sales totaling about 1000 tons per day. In contrast to the domestic market, export prices advanced

slightly from the mid-week level of 9.97c. per lb., c.i.f., usual Continental base ports, to 10.05c. on Saturday. Sales abroad have been running about 3500 tons per day. Copper deliveries in November declined to 37,025 tons from 48,440 tons in October, and stocks rose to the highest position reached since June, 1936, the month's gain of 38,765 tons over October raising the stock figure to 221,676 tons. Mine production in November dropped to 69,898 tons from 80,437 tons in the previous month.

Zinc

A quiet holiday market prevailed throughout the week, with sales totaling about the same as the previous week. Quotations are unchanged at 5.35c. per lb., New York. Prices on the London exchange were up slightly over the week-end, today's equivalent of 3.36c. per lb., London, being three points above Friday's price.

Lead

The only feature of the week's market was a reduction in prices on Thursday of \$5 per ton to a basis of 4.75c. per lb., New York. The price cut has had no apparent effect on demand, and current buying is limited entirely to carload purchases for immediate delivery. Prices in London moved downward during the week, this morning's quotation of 3.46c. per lb., being 19 points below the price of a week ago.

Brass and Bronze Ingots

The average prices received by members of the Non-Ferrous Ingot Metal Institute during the 28-day period ended Nov. 26 on commercial 80-10-10 and 85 per cent brass were 13.017c. and 11.395c. per lb. respectively. These compare with 14.732c. and 12.743c. in the preceding month. Unfilled orders on Dec. 1 amounted to 13,936 tons as compared with 15,557 tons on Nov. 1, and deliveries, totaling 3805 tons in the November period, were 1625 tons below the previous month's total.

Tin

Despite the lack of interest shown by consumers and the resultant low level of buying activity, the market has shown unexpected steadiness. Prices over the week move downward slowly without the sharp, erratic jumps that have characterized price declines in the past. Today's quotation of 42.375c. per lb., New York, represents the month's lowest price and is 1.75c. below the price of a week ago.

The Week's Prices. Cents Per Pound for Early Delivery

| | Dec. 14 | Dec. 15 | Dec. 16 | Dec. 17 | Dec. 18 | Dec. 20 |
|-----------------------------|---------|---------|---------|---------|---------|---------|
| Electrolytic copper, Conn.* | 10.25 | 10.25 | 10.125 | 10.125 | 10.125 | 10.125 |
| Lake copper, N. Y. | 11.125 | 11.125 | 11.125 | 11.125 | 11.125 | 11.125 |
| Straits tin, spot, New York | 43.50 | 43.375 | 43.50 | 42.50 | ... | 42.375 |
| Zinc, East St. Louis.... | 5.00 | 5.00 | 5.00 | 5.00 | 5.00 | 5.00 |
| Zinc, New York | 5.35 | 5.35 | 5.35 | 5.35 | 5.35 | 5.35 |
| Lead, St. Louis | 4.85 | 4.85 | 4.60 | 4.60 | 4.60 | 4.60 |
| Lead, New York | 5.00 | 5.00 | 4.75 | 4.75 | 4.75 | 4.75 |

*Delivered Connecticut Valley; price 1/4c. lower delivered in New York. Aluminum, virgin, 99 per cent plus 20.00c.-21.00c. a lb., delivered. Aluminum No. 12 remelt No. 2 standard, in carloads, 19.00c. to 19.50c. a lb., delivered. Nickel, electrolytic, 35c. to 36c. a lb. base refinery, in lots of 2 tons or more. Antimony, Asiatic, 14.50c. a lb., prompt, f.o.b., New York. Antimony, American, 14.00c. per lb., prompt shipment, New York. Quicksilver, \$81.00 to \$83.00 per flask of 76 lb. Brass ingots, commercial 85-5-5-5, 11.25c. a lb., less carload, delivered in Middle West 1/4c. a lb. is added on orders for less than 40,000 lb.

From New York Warehouse

Delivered Prices, Base per Lb.

| | |
|--|--------------------|
| Tin, Straits pig | 44.00c. to 45.00c. |
| Tin, bar | 46.00c. to 47.00c. |
| Copper, Lake | 12.75c. to 13.75c. |
| Copper, electrolytic | 12.75c. to 13.75c. |
| Copper, castings | 12.50c. to 13.50c. |
| *Copper sheets, hot-rolled | 19.125c. |
| *High brass sheets | 17.375c. |
| *Seamless brass tubes | 20.125c. |
| *Seamless copper tubes | 19.875c. |
| *Brass rods | 13.375c. |
| Zinc, slabs | 6.75c. to 7.75c. |
| Zinc, sheets (No. 9), casks, 1200 lb. and over | 12.00c. |
| Lead, American pig | 5.75c. to 6.75c. |
| Lead, bar | 7.00c. to 8.00c. |
| Lead, sheets, cut | 8.50c. |
| Antimony, Asiatic | 16.00c. to 17.00c. |
| Alum., virgin, 99 per cent plus | 22.50c. to 24.00c. |
| Alum., No. 1 for remelting, 98 to 99 per cent | 19.50c. to 21.00c. |
| Solder, 1/2 and 1/4 | 31.00c. to 33.00c. |
| Babbitt metal, commercial grade | 20.00c. to 60.00c. |

*These prices, which are also for delivery from Chicago and Cleveland warehouses, are quoted with 25 per cent allowed off for extras, except copper sheets and brass rods, on which allowance is 40 per cent.

From Cleveland Warehouse

Delivered Prices per Lb.

| | |
|------------------|----------|
| Tin, Straits pig | 46.635c. |
|------------------|----------|

| | |
|-----------------------------|--------------------|
| Tin, bar | 48.635c. |
| Copper, Lake | 11.00c. to 12.25c. |
| Copper, electrolytic | 11.00c. to 12.25c. |
| Copper, castings | 10.50c. to 10.75c. |
| Zinc, slabs | 8.25c. to 8.50c. |
| Lead, American pig | 5.25c. to 5.50c. |
| Lead, bar | 8.75c. |
| Antimony, Asiatic | 17.25c. to 17.75c. |
| Babbitt metal, medium grade | 18.50c. |
| Babbitt metal, high grade | 60.635c. |
| Solder, 1/2 and 1/4 | 26.25c. |

Old Metals, Per Lb., New York

Buying prices are paid by dealers for miscellaneous lots from smaller accumulators and selling prices are those charged to consumers after the metal has been prepared for their uses. (All prices are nominal.)

| | Dealers' Buying Prices | Dealers' Selling Prices |
|---|------------------------|-------------------------|
| Copper, hvy. crucible | 7.875c. | 8.625c. |
| Copper, hvy. and wire | 7.25c. | 7.75c. |
| Copper, light and bottoms | 6.25c. | 6.50c. |
| Brass, heavy | 4.375c. | 5.00c. |
| Brass, light | 3.375c. | 4.125c. |
| Hvy. machine composition | 6.875c. | 7.375c. |
| No. 1 yel. brass turnings | 4.75c. | 5.25c. |
| No. 1 red brass or composition turnings | 6.50c. | 7.00c. |
| Lead, heavy | 4.00c. | 4.375c. |
| Cast aluminum | 10.625c. | 11.75c. |
| Sheet aluminum | 12.00c. | 13.50c. |
| Zinc | 2.875c. | 3.125c. |



IRON AND STEEL SCRAP

... Pittsburgh, Chicago higher.

• • •

... Composite up 10c. to \$13.58.

DEC. 21.—Chicago is the only market in which the price of No. 1 steel has been advanced this week over last, the rise being 50c. as a result of broker-dealer bidding to cover old orders, many of them \$4 to \$5 higher than the present level. THE IRON AGE composite now stands at \$13.58, 16c. above the average price of a week ago and 8c. above the figure prevailing on Nov. 9, which had tumbled almost \$1 from the week previous. Railroad heavy melting steel is a trifle stronger at Pittsburgh, as well as some railroad specialties there, but the indications are that the market will mark time until after the holidays. In the face of further seasonal recessions in steel mill activity at this time and the lack of any new sales into consumption in the last week, the more or less expected upturn in scrap prices, now begun, will have to wait for the new year before gathering any real speed.

Pittsburgh

The market continues firm, although no additional sales into consumption have been made in the past week. Dealers are finding it difficult to pick up No. 1 steel and are paying prices ranging from \$13.50 to \$14 a ton. A few consumers have had feelers out during the past 10 days or so with the probable idea in mind of making commitments in the near future. Some users of scrap are of the opinion that if and when a definite upward trend in prices sets in, the advance will be sharp. Little or no interest in buying will be evinced during the rest of the week owing to holiday influences.

Chicago

Mills have not yet entered the market, but broker-dealer transactions for coverage of old orders have boosted the price of heavy melting steel another 50c. a ton to \$12.50 to \$13. Brokers' bids are understood to be ranging as high as \$14 for carload lots, and it is said that little is coming out even at that price. Many orders, most of which were taken at \$17 and \$18, are still on the books, and there

appears to be little desire to sell on the part of dealers or brokers. Some consumer interest other than steel mill has been expressed for scrap, and inquiries are being received for shipment after Jan. 1.

Cleveland

While other districts appear sentimentally stronger, the improved tone has not yet been reflected here, No. 1 heavy melting steel remaining at \$12 to \$12.50 per ton for the third week. The checking of the sharp decline in prices has been heartening, but there is still no indication of renewed mill buying. With numerous plants operating on reduced schedules, not much scrap is coming out. At the current quotations, it is generally conceded no large tonnages could be obtained by the mills.

Buffalo

Shipments of scrap now are moving freely into the yards of the largest area consumer after a prolonged period of restriction on local scrap. While dealers are glad of the opportunity at last to get extensive commitments off their hands, there is a growing feeling that something should be done to restore the alignment that proverbially obtains between the prices of scrap, pig iron and finished steel. Light sales of foundry scrap (No. 1 cupola) at \$14 to \$14.50 are the only new orders now out, except for approximately 5000 tons of steel that was obtained through the price-averaging arrangement mentioned last week.

Philadelphia

Surprisingly, the local market's strong undertone continues in spite of a continued decline in mill operations. No actual mark-up in No. 1 has been made, although present sentiment would indicate that no large tonnage could be secured at published quotations. No. 2 is up 50c. on a recent sale, as is also stove plate, but the remainder of the list remains the same, albeit untested. The December Pennsylvania Railroad list (No. 1) supposedly went to a Pittsburgh consumer, but from the way carloads of steel are piling up at Girard Point it would seem that some (or a great percentage) of this material is being diverted to export. In contrast to the

present bullishness in the market, it is nonetheless important to consider that one year ago today local mills were considerably better stocked and were far more active than they are now, but scrap prices here were only in the neighborhood of \$16, even with export far more active.

St. Louis

This continues to be a dealers' market, as far as scrap iron is concerned. The mills in the St. Louis area are not buying anything, but there is some buying by dealers to cover their short interest, which has given added strength to the market. The only railroad offering is 25 carloads of scrap rails by the Missouri Pacific. Dealers report that the Louisville & Nashville list, most of which went to Eastern markets, realized prices from \$1 to \$1.50 a ton higher than the previous month's offering.

Cincinnati

With the new year imminent, feeling in the scrap market tends to be brighter, although business fails to justify the reaction. A few small sales are reported, but these are without definite market significance. Dealer activity on speculative basis is greater, although a fair portion of purchases is being laid down in yards.

Detroit

Uneasy sentiment was apparent among local dealers during the last week. Anticipated mill buying on a small scale at today's low prices failed to materialize. Some movement of borings and turnings into the hands of dealers to be stored for export was reported, and one moderate shipment of long turnings by rail was made during the week.

New York

Dealers' buying prices are unchanged in the New York market, but activity is showing the seasonal lull around the holidays. Some explanation is due on the price for Nos. 1 and 2 steel on cars. At \$11 and \$9.50, these are actual buying prices on a recent order for delivery into eastern Pennsylvania, although one broker offers \$12.50 for No. 1 on the basis that he could deliver to barges for export. For the eighth consecutive week, the delivered barge price for No. 1 steel is \$13.50.

Boston

The market for steel turnings, Pennsylvania delivery, has settled at \$2.50 a ton on cars, and for blast furnace material at \$6.50, but very little is moving. Small tonnages of stove plate are selling at \$8.25 a ton on cars for Massachusetts consumption. In contrast with the domestic market, export material is moving in large volume at very firm but unchanged prices. Last week around 12,000 tons left for England and Italy, and fresh loadings are expected to start this week from both Boston and Providence.

Iron and Steel Scrap Prices

PITTSBURGH

| Per gross ton to delivered to consumer: | |
|---|--------------------|
| No. 1 hvy. mltng. steel. | \$13.50 to \$14.00 |
| Railroad hvy. mltng. | 14.75 to 15.25 |
| No. 2 hvy. mltng. steel. | 12.00 to 12.50 |
| Scrap rails | 14.75 to 15.25 |
| Rails 3 ft. and under.. | 18.00 to 18.50 |
| Comp. sheet steel | 13.50 to 14.00 |
| Hand bundled sheets.. | 12.50 to 13.00 |
| Hvy. steel axle turn.. | 12.00 to 12.50 |
| Machine shop turn.... | 7.50 to 8.00 |
| Short shov. turn.... | 7.50 to 8.00 |
| Mixed bor. & turn.... | 6.50 to 7.00 |
| Cast iron borings.... | 6.50 to 7.00 |
| Cast iron carwheels... | 15.00 to 15.50 |
| Hvy. breakable cast.... | 12.50 to 13.00 |
| No. 1 cupola cast.... | 16.00 to 16.50 |
| RR. knuckles & cplrs. | 18.00 to 18.50 |
| Rail coil & leaf springs | 18.00 to 18.50 |
| Rolled steel wheels... | 18.00 to 18.50 |
| Low phos. billet crops. | 18.00 to 18.50 |
| Low phos. sh. bar | 17.50 to 18.00 |
| Low phos. punchings... | 16.50 to 17.00 |
| Low phos. plate, hvy.... | 17.00 to 17.50 |
| Low phos. plate clips.. | 14.50 to 15.00 |
| Steel car axles..... | 17.50 to 18.00 |

CLEVELAND

| Per gross ton to delivered to consumer: | |
|---|--------------------|
| No. 1 hvy. mltng. steel. | \$12.00 to \$12.50 |
| No. 2 hvy. mltng. steel. | 11.00 to 11.50 |
| Comp. sheet steel | 11.50 to 12.00 |
| Light bund. stampings. | 8.50 to 9.00 |
| Drop forge flashings... | 11.00 to 11.50 |
| Machine shop turn.... | 7.00 to 7.50 |
| Short shov. turn.... | 8.50 to 9.00 |
| No. 1 busheling | 11.00 to 11.50 |
| Steel axle turnings.... | 9.50 to 10.00 |
| Low phos. billet and | |
| bloom crops | 18.50 to 19.50 |
| Cast iron borings.... | 8.50 to 9.00 |
| Mixed bor. & turn.... | 8.50 to 9.00 |
| No. 2 busheling | 8.50 to 9.00 |
| No. 1 cast | 16.50 to 17.00 |
| Railroad grate bars... | 8.00 to 8.50 |
| Stove plate | 8.00 to 8.50 |
| Rails under 3 ft. | 18.00 to 18.50 |
| Rails for rolling | 16.00 to 16.50 |
| Railroad malleable ... | 16.00 to 16.50 |
| Cast iron carwheels... | 15.00 to 15.50 |

BUFFALO

| Per gross ton, f.o.b. consumers' plants: | |
|--|--------------------|
| No. 1 hvy. mltng. steel. | \$13.00 to \$13.50 |
| No. 2 hvy. mltng. steel. | 11.00 to 11.50 |
| New hvy. b'dled sheets | 11.00 to 11.50 |
| Old hydraul. bundles... | 10.00 to 10.50 |
| Drop forge flashings.. | 11.00 to 11.50 |
| No. 1 busheling | 11.00 to 11.50 |
| Hvy. axle turnings ... | 11.50 to 12.00 |
| Machine shop turn.... | 7.00 to 7.50 |
| Knuckles & couplers. | 16.50 to 17.00 |
| Coil & leaf springs... | 16.50 to 17.00 |
| Rolled steel wheels... | 16.50 to 17.00 |
| Low phos. billet crops. | 17.50 to 18.00 |
| Shov. turnings | 9.50 to 10.00 |
| Mixed bor. & turn.... | 8.50 to 9.00 |
| Cast iron borings.... | 8.50 to 9.00 |
| Steel car axles.... | 16.50 to 17.00 |
| No. 1 machinery cast. | 15.00 to 15.50 |
| No. 1 cupola cast.... | 14.00 to 14.50 |
| Stove plate | 12.00 to 12.50 |
| Steel rails under 3 ft. | 17.00 to 17.50 |
| Cast iron carwheels... | 15.00 to 15.50 |
| Railroad malleable ... | 15.00 to 15.50 |
| Chemical borings | 10.50 to 11.00 |

ST. LOUIS

| Dealers' buying prices per gross ton de-livered to consumer: | |
|--|--------------------|
| Selected hvy. melting. | \$13.00 to \$13.50 |
| No. 1 hvy. melting.... | 13.00 to 13.50 |
| No. 2 hvy. melting.... | 12.00 to 12.50 |
| No. 1 locomotive tires... | 16.00 to 16.50 |
| Misc. stand.-sec. rails. | 13.50 to 14.00 |
| Railroad springs | 15.00 to 15.50 |
| Bundled sheets | 8.00 to 8.50 |
| No. 1 busheling | 7.00 to 7.50 |
| Cast bor. & turn.... | 6.00 to 6.50 |
| Rails for rolling | 14.50 to 15.00 |
| Machine shop turn.... | 6.00 to 6.50 |
| Heavy turnings | 8.50 to 9.00 |
| Steel car axles.... | 19.50 to 20.00 |
| Iron car axles.... | 21.50 to 22.00 |
| No. 1 RR. wrought.... | 8.00 to 8.50 |
| No. 2 RR. wrought.... | 13.00 to 13.50 |
| Steel rails under 3 ft. | 16.00 to 16.50 |
| Steel angle bars.... | 14.50 to 15.00 |
| Cast iron carwheels... | 13.50 to 14.00 |
| No. 1 machinery cast. | 12.75 to 13.25 |
| Railroad malleable ... | 13.50 to 14.00 |
| No. 1 railroad cast.... | 13.25 to 13.75 |
| Stove plate | 9.00 to 9.50 |
| Agric. malleable ... | 10.00 to 10.50 |
| Grate bars | 9.50 to 10.00 |
| Brake shoes | 9.50 to 10.00 |

CINCINNATI

| Dealers' buying prices per gross ton: | |
|---------------------------------------|-------------------|
| No. 1 hvy. mltng. steel. | \$9.50 to \$10.00 |
| No. 2 hvy. mltng. steel. | 7.50 to 8.00 |
| Scrap rails for mltng. | 14.50 to 15.00 |
| Loose sheet clippings. | 6.00 to 6.50 |
| Hydrau. b'dled sheets | 9.50 to 10.00 |
| Cast iron borings.... | 3.50 to 4.00 |
| Machine shop turn.... | 4.00 to 4.50 |
| No. 1 busheling.... | 8.00 to 8.50 |
| No. 2 busheling.... | 3.00 to 3.50 |
| Rails for rolling | 16.50 to 17.00 |
| No. 1 locomotive tires. | 13.00 to 13.50 |
| Short rails | 17.00 to 17.50 |
| Cast iron carwheels. | 11.50 to 12.00 |
| No. 1 machinery cast. | 10.50 to 11.00 |
| No. 1 railroad cast.... | 9.00 to 9.50 |
| Burnt cast | 5.50 to 6.00 |
| Stove plate | 5.50 to 6.00 |
| Agric. malleable ... | 10.50 to 11.00 |
| Railroad malleable ... | 12.50 to 13.00 |
| Mixed hvy. cast.... | 7.50 to 8.00 |

YOUNGSTOWN

| Per gross ton to delivered to consumer: | |
|---|--------------------|
| No. 1 hvy. mltng. steel. | \$13.00 to \$13.50 |
| Hydraulic bundles ... | 12.50 to 13.00 |
| Machine shop turn.... | 10.00 to 10.50 |

BIRMINGHAM

| Per gross ton delivered to consumer: | |
|--------------------------------------|--------------------|
| Hvy. melting steel.... | \$16.00 to \$16.50 |
| Scrap steel rails.... | 17.00 |
| Short shov. turnings.... | 8.50 |
| Stove plate | 10.50 |
| Steel axles | 18.00 to 19.00 |
| Iron axles | 15.50 to 18.00 |
| No. 1 RR. wrought.... | 13.00 to 15.00 |
| Rails for rolling | 18.00 to 20.00 |
| No. 1 cast | 16.00 to 18.00 |
| Tramcar wheels | 16.00 to 18.00 |

DETROIT

| Dealers' buying prices per gross ton: | |
|--|-------------------|
| No. 1 hvy. mltng. steel. | \$9.50 to \$10.00 |
| No. 2 hvy. mltng. steel. | 8.00 to 8.50 |
| Borings and turnings... | 6.25 to 6.75 |
| Long turnings | 5.75 to 6.25 |
| Short shov. turnings... | 6.75 to 7.25 |
| No. 1 machinery cast. | 11.75 to 12.25 |
| Automotive cast | 12.75 to 13.25 |
| Hvy. breakable cast.... | 10.25 to 10.75 |
| Hydrau. comp. sheets. | 10.50 to 11.00 |
| Stove plate | 7.50 to 8.00 |
| New factory bushel.... | 9.50 to 10.00 |
| Old No. 2 busheling... | 5.00 to 5.50 |
| No. 2 busheling (black fender stock) | Nominal |
| Sheet clippings | 7.00 to 7.50 |
| Flashings | 8.50 to 9.00 |
| Low phos. plate scrap. | 10.50 to 11.00 |

NEW YORK

| Dealers' buying prices per gross ton on cars: | |
|---|--------------------|
| No. 1 hvy. mltng. steel. | \$10.50 to \$11.00 |
| No. 2 hvy. mltng. steel. | 9.00 to 9.50 |
| Hvy. breakable cast.... | 9.50 to 10.00 |
| No. 1 machinery cast. | 11.50 to 12.00 |
| No. 2 cast | 9.50 to 10.00 |
| Stove plate | 8.50 to 9.00 |
| Steel car axles.... | 19.00 to 19.50 |
| Shafting | 16.00 to 16.50 |
| No. 1 RR. wrought.... | 11.00 to 11.50 |
| No. 1 wrought long.... | 10.00 to 10.50 |
| Spec. iron & steel pipe | 9.00 to 9.50 |
| Rails for rolling | 16.00 to 16.50 |
| Clean steel turnings.... | 5.00 to 5.50 |
| Cast borings | 5.00 to 5.50 |
| No. 1 blast furnace.... | 5.00 to 5.50 |
| Cast borings (chem.)... | 10.00 to 10.50 |
| Unprepared yard scrap. | 7.50 to 8.00 |
| Per gross ton, delivered local foundries: | |
| No. 1 machn. cast.... | \$15.50 to \$16.00 |
| No. 2 cast | 11.00 to 11.50 |

BOSTON

| Dealers' buying prices per gross ton: | |
|---|--------------------|
| No. 1 hvy. mltng. steel. | \$13.30 to \$13.80 |
| Scrap rails | 13.30 to 13.80 |
| No. 2 steel | 12.30 to 12.80 |
| Breakable cast.... | 8.50 |
| Machine shop turn.... | 2.50 |
| Mixed bor. & turn.... | 2.50 |
| Bun. skeleton long.... | 6.50 |
| Shafting | 17.50 to 18.00 |
| Cast bor. chemical.... | 8.00 to 8.50 |
| Per gross ton delivered consumers' yards: | |
| Textile cast | \$15.50 to \$16.00 |
| No. 1 machine cast.... | 15.50 to 16.00 |

PACIFIC COAST

| Per gross ton delivered to consumer: | |
|--------------------------------------|--------------------|
| No. 1 hvy. mltng. steel. | \$10.50 to \$11.00 |
| No. 2 hvy. mltng. steel. | 9.50 to 10.00 |

CANADA

| Dealers' buying prices at their yards, per gross ton: | |
|---|-------------------|
| Toronto Montreal | |
| No. 1 hvy. mltng. steel. | \$10.50 to \$9.50 |
| No. 2 hvy. mltng. steel. | 9.50 to 8.50 |
| Mixed dealers' steel.... | 8.50 to 7.50 |
| Scrap pipe | 8.50 to 7.50 |
| Steel turnings | 7.50 to 7.00 |
| Cast borings | 8.50 to 7.50 |
| Machinery cast | 15.00 to 14.00 |
| Dealers' cast | 13.00 to 12.00 |
| Stove plate | 11.00 to 10.50 |

EXPORT

| Dealers' buying prices per gross ton: | |
|---|--------------|
| New York, truck lots, delivered, barges | |
| No. 1 hvy. mltng. steel. | \$13.50 |
| No. 2 hvy. mltng. steel. | 12.00 |
| No. 2 cast | 11.00 |
| Stove plate | 8.50 to 9.00 |
| Boston on cars at Army Base or Mystic Wharf | |
| No. 1 hvy. mltng. steel. | \$14.00 |
| No. 2 hvy. mltng. steel. | 13.00 |
| Rails (scrap) | 14.00 |

| Philadelphia, delivered alongside boats, Port Richmond | |
|--|--------------------|
| No. 1 hvy. mltng. steel. | \$14.50 to \$15.00 |
| No. 2 hvy. mltng. steel. | 13.50 to 14.00 |

PRICES ON FINISHED AND SEMI-FINISHED IRON AND STEEL

SEMI-FINISHED STEEL

Billets, Blooms and Slabs

F.o.b. Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Buffalo, Birmingham. Prices at Duluth are \$2 a ton higher, and delivered Detroit \$3 higher.

Per Gross Ton

Rerolling \$37.00
Forging quality 43.00

Sheet Bars

F.o.b. Pittsburgh, Chicago, Cleveland, Youngstown, Buffalo, Canton, Sparrows Point, Md.

Per Gross Ton

Open-hearth or Bessemer \$37.00

Skelp

F.o.b. Pittsburgh, Chicago, Youngstown, Buffalo, Coatesville, Pa., Sparrows Point, Md.

Per Lb.
Grooved, universal and sheared 2.10c.

Wire Rods

(No. 5 to 9/32 in.)

Per Gross Ton

F.o.b. Pittsburgh or Cleveland \$47.00

F.o.b. Chicago, Youngstown or Anderson, Ind. 48.00

F.o.b. Worcester, Mass. 49.00

F.o.b. Birmingham 50.00

F.o.b. San Francisco 56.00

F.o.b. Galveston 53.00

Rods over 9/32 in. or 47/64 in. inclusive, \$5 a ton over base.

BARS, PLATES, SHAPES

Iron and Steel Bars

Soft Steel

Base per Lb.

F.o.b. Pittsburgh 2.45c.

F.o.b. Chicago or Gary 2.50c.

F.o.b. Duluth 2.60c.

Del'd Detroit 2.60c.

F.o.b. Cleveland 2.50c.

F.o.b. Buffalo 2.55c.

Del'd Philadelphia 2.75c.

Del'd New York 2.80c.

F.o.b. Birmingham 2.60c.

F.o.b. cars dock Gulf ports 2.85c.

F.o.b. cars Pacific Ports 3.00c.

Rail Steel

(For merchant trade)

F.o.b. Pittsburgh 2.30c

F.o.b. Cleveland, Chicago, Gary or Moline, Ill. 2.35c.

F.o.b. Buffalo 2.40c.

F.o.b. Birmingham 2.45c.

F.o.b. cars dock Gulf ports 2.70c.

F.o.b. cars dock Pacific ports 2.85c.

Billet Steel Reinforcing

(Straight lengths as quoted by distributors)

F.o.b. Pittsburgh 2.45c.

F.o.b. Buffalo, Cleveland, Youngstown, Chicago, Gary or Birmingham 2.50c.

Del'd Detroit 2.60c.

F.o.b. cars dock Gulf ports 2.85c.

F.o.b. cars dock Pacific ports 2.85c.

Rail Steel Reinforcing

(Straight lengths as quoted by distributors)

F.o.b. Pittsburgh 2.30c.

F.o.b. Buffalo, Cleveland, Youngstown, Chicago, Gary or Birmingham 2.35c.

F.o.b. cars dock Gulf ports 2.70c.

F.o.b. cars dock Pacific ports 2.70c.

Iron

F.o.b. Chicago 2.40c.

F.o.b. Pittsburgh (refined) 3.60c.

Cold Finished Bars and Shafting*

Base per Lb.

F.o.b. Pittsburgh 2.90c.

F.o.b. Cleveland, Chicago and Gary 2.95c.

F.o.b. Buffalo 3.00c.

F.o.b. Detroit 2.95c.

* In quantities of 10,000 to 19,999 lb.

Plates

Base per Lb.

F.o.b. Pittsburgh 2.25c.

F.o.b. Chicago or Gary 2.30c.

Del'd Cleveland 2.445c.

F.o.b. Coatesville or Spar. Pt. 2.35c.

Del'd Philadelphia 2.44c.

Del'd New York 2.54c.

F.o.b. Birmingham 2.40c.

F.o.b. cars dock Gulf ports 2.65c.
F.o.b. cars dock Pacific ports 2.80c.
Wrought iron plates, f.o.b. Pittsburgh 3.80c.

Floor Plates

F.o.b. Pittsburgh 3.50c.

F.o.b. Chicago 3.55c.

F.o.b. Coatesville 3.60c.

F.o.b. cars dock Gulf ports 3.90c.

F.o.b. cars dock Pacific ports 4.05c.

Structural Shapes

Base per Lb.

F.o.b. Pittsburgh 2.25c.

F.o.b. Chicago 2.30c.

Del'd Cleveland 2.445c.

F.o.b. Buffalo or Bethlehem 2.35c.

Del'd Philadelphia 2.465c.

Del'd New York 2.5125c.

F.o.b. Birmingham (standard) 2.40c.

F.o.b. cars dock Gulf ports 2.65c.

F.o.b. cars dock Pacific ports 2.80c.

Steel Sheet Piling

Base per Lb.

F.o.b. Pittsburgh 2.60c.

F.o.b. Chicago or Buffalo 2.70c.

F.o.b. cars dock Gulf or Pacific Coast ports 3.05c.

RAILS AND TRACK SUPPLIES

F.o.b. Mill

Standard rails, heavier than 60 lb., per gross ton \$42.50

Angle bars, per 100 lb. 2.80

F.o.b. Basing Points

Light rails (from billets) per gross ton \$43.00

Light rails (from rail steel) per gross ton 42.00

Base per Lb.

Spikes 3.15c.

Tie plates, steel 2.30c.

Tie plates, Pacific Coast ports 2.40c.

Track bolts, to steam railroads 4.35c.

Track bolts, to jobbers, all sizes (per 100 counts) 65-5 per cent off list

Basing points on light rails are Pittsburgh, Chicago and Birmingham; on spikes and tie plates, Pittsburgh, Chicago, Portland, Oreg., Winston, W. Va., St. Louis, Kansas City, Minneapolis, Colo., Birmingham and Pacific Coast ports; on tie plates alone, Steelton, Pa., Buffalo; on spikes alone, Youngstown, Lebanon, Pa., Richmond, Va.

SHETS, STRIP, TIN PLATE

TERNE PLATE

Sheets

Hot Rolled

Base per Lb.

No. 10, f.o.b. Pittsburgh 2.40c.

No. 10, f.o.b. Gary 2.50c.

No. 10, del'd Detroit 2.60c.

No. 10, del'd Philadelphia 2.70c.

No. 10, f.o.b. Granite City 2.60c.

No. 10, f.o.b. Birmingham 2.55c.

No. 10, f.o.b. cars dock Pacific ports 2.95c.

No. 10, wrought iron, P'gh 4.25c.

Hot-Rolled Annealed

No. 24, f.o.b. Pittsburgh 3.15c.

No. 24, f.o.b. Gary 3.25c.

No. 24, del'd Detroit 3.35c.

No. 24, del'd Philadelphia 3.45c.

No. 24, f.o.b. Granite City 3.35c.

No. 24, f.o.b. Birmingham 3.30c.

No. 24, f.o.b. cars dock Pacific ports 3.80c.

No. 24, wrought iron, Pitts-burgh 5.15c.

Heavy Cold-Rolled

No. 10 gage, f.o.b. Pittsburgh 3.10c.

No. 10 gage, f.o.b. Gary 3.20c.

No. 10 gage, f.o.b. Detroit 3.30c.

No. 10 gage, del'd Philadelphia 3.40c.

No. 10, f.o.b. Granite City 3.30c.

No. 10 gage, f.o.b. Birmingham 3.25c.

No. 10 gage, f.o.b. cars dock Pacific ports 3.70c.

Light Cold-Rolled

No. 20 gage, f.o.b. Pittsburgh 3.55c.

No. 20 gage, f.o.b. Gary 3.65c.

No. 20 gage, del'd Detroit 3.75c.

No. 20 gage, del'd Philadelphia 3.85c.

No. 20 gage, f.o.b. Granite City 3.75c.

No. 20 gage, f.o.b. Birmingham 3.70c.

No. 20 gage, f.o.b. cars dock Pacific ports 4.10c.

Galvanized Sheets

No. 24 gage, f.o.b. Pittsburgh 3.80c.

No. 24, f.o.b. Gary 3.90c.

No. 24, del'd Philadelphia 4.10c.

Cold-Rolled Strip*

No. 24, f.o.b. Granite City 4.00c.

No. 24, f.o.b. Birmingham 3.95c.

No. 24, f.o.b. cars, dock, Pacific ports 4.40c.

No. 24, wrought iron, Pittsburgh 6.10c.

Base per Lb.
Field grade 3.35c.
Armature 3.70c.

Electrical 4.20c.

Special Motor 5.10c.

Special Dynamo 5.80c.

Transformer 6.30c.

Transformer Special 7.30c.

Transformer Extra Special 7.80c.

Base gage changed from 28 to 24 gage. Gage extras are the same as those applying on hot-rolled, annealed sheets with few exceptions.

Silicon Strip in coils—Sheet price plus silicon sheet extra width extras plus 25c per 100 lb. for coils.

Long Ternes
No. 24, unassorted 8-lb. coating
f.o.b. Pittsburgh 4.10c.

F.o.b. Gary 4.20c.

F.o.b. cars, dock, Pacific ports 480c.

Vitreous Enameling Stock

No. 20, f.o.b. Pittsburgh 3.50c.

No. 20, f.o.b. Gary 3.60c.

No. 20, f.o.b. Granite City 3.70c.

No. 20, f.o.b. cars dock Pacific ports 4.10c.

Tin Mill Black Plate
No. 28, f.o.b. Pittsburgh, per lb. 3.30c.

No. 28, Gary 3.40c.

No. 28, f.o.b. Granite City 3.50c.

No. 28, cars dock Pacific ports, boxed 4.175c.

Tin Plate

Base per Box

Standard cokes, f.o.b. Pittsburgh district mill \$5.35

Standard cokes, f.o.b. Gary 5.45

Standard coke, f.o.b. Granite City 5.55

Special Coated Manufacturing Terne

Base per Box

F.o.b. Pittsburgh \$4.65

F.o.b. Gary 4.75

F.o.b. Granite City 4.85

Roofing Terne Plate

(F.o.b. Pittsburgh)

(Per Package, 112 sheets, 20 x 28 in.)

8-lb. coating I.C. \$12.00

15-lb. coating I.C. 14.00

20-lb. coating I.C. 15.00

25-lb. coating I.C. 16.00

30-lb. coating I.C. 17.25

40-lb. coating I.C. 19.50

Hot-rolled Hoops, Bands, Strip and Flats under 1/4 In.

Base per Lb.

All widths up to 24 in., Pittsburgh 2.40c.

All widths up to 24 in., Chicago 2.50c.

All widths up to 24 in., del'd Detroit 2.60c.

All widths up to 24 in., Granite City 2.60c.

All widths up to 24 in., Birmingham 2.55c.

Cooperage stock, Pittsburgh 2.50c.

Cooperage stock, Chicago 2.60c.

Cold-Rolled Strip*

Base per Lb.

F.o.b. Pittsburgh 3.20c.

F.o.b. Cleveland 3.20c.

Del'd Chicago 3.48c.

F.o.b. Worcester 3.40c.

* Carbon 0.25 and less.

Cold Rolled Spring Steel

WIRE PRODUCTS

(Carload lots, f.o.b. Pittsburgh and Cleveland)

To Manufacturing Trade

Per Lb.

| | |
|---|--------|
| Bright wire | 2.90c. |
| Galvanized wire | 2.95c. |
| Spring wire | 3.50c. |
| Chicago prices on products sold to the manufacturing trade are \$1 a ton above Pittsburgh or Cleveland. Worcester and Duluth prices are \$2 a ton above Birmingham \$3 above, and Pacific Coast prices \$9 a ton above Pittsburgh or Cleveland. | |

To the Trade

Base per Keg

| | |
|---------------------|--------|
| Standard wire nails | \$2.75 |
| Smooth coated nails | \$2.75 |
| Cut nails, carloads | \$3.60 |

Base per 100 Lb.

| | |
|--|--------|
| Annealed fence wire | \$3.15 |
| Galvanized fence wire | 3.55 |
| Polished staples | 3.45 |
| Galvanized staples | 3.70 |
| Barbed wire, galvanized | 3.40 |
| Twisted barbless wire | 3.40 |
| Woven wire fence, base column | .75 |
| Single loop bale ties, base col. | .63 |
| Chicago and Anderson, Ind., mill prices are \$1 a ton over Pittsburgh base (on all products except woven wire fence, for which the Chicago price is \$2 above Pittsburgh); Duluth, Minn., mill prices are \$2 a ton over Pittsburgh, except for woven wire fence, which is \$3 over Pittsburgh and Birmingham mill prices are \$3 a ton over Pittsburgh. | |

On wire nails, barbed wire and staples, prices at Houston, Galveston and Corpus Christi, Tex., New Orleans, Lake Charles, La., and Mobile, Ala., are \$6 a ton over Pittsburgh.

On nails, staples and barbed wire, prices of \$6 a ton over Pittsburgh are also quoted at Beaumont and Orange, Tex.

STEEL AND WROUGHT IRON PIPE AND TUBING

Welded Pipe

Base Discounts, f.o.b. Pittsburgh District and Lorain, Ohio, Mills

F.o.b. Pittsburgh only on wrought iron pipe.

Butt Weld

| Steel | Wrought Iron |
|-------------------|-----------------|
| In. Black Galv. | In. Black Galv. |
| 1/8 ... 52 | 31 |
| 1/8 to 3/8 ... 55 | 38 1/2 |
| 1/2 ... 59 1/2 | 49 |
| 3/4 ... 62 1/2 | 53 |
| 1 to 3 ... 64 1/2 | 55 1/2 |

Lap Weld

| | |
|--------------------|--------|
| 2 ... 57 | 47 1/2 |
| 2 1/2 & 3 ... 60 | 50 1/2 |
| 3 1/2 to 6 ... 62 | 52 1/2 |
| 7 & 8 ... 61 | 50 1/2 |
| 9 & 10 ... 60 1/2 | 50 |
| 11 & 12 ... 59 1/2 | 49 |

| | |
|-------------------------------------|--------|
| Butt Weld, extra strong, plain ends | |
| 1/8 ... 50 1/2 | 36 1/2 |
| 1/4 to 3/8 ... 52 1/2 | 40 1/2 |
| 1/2 ... 57 1/2 | 48 1/2 |
| 3/4 ... 61 1/2 | 52 1/2 |
| 1 to 3 ... 63 | 55 |

| | |
|------------------------------------|--------|
| Lap Weld, extra strong, plain ends | |
| 2 ... 55 | 46 1/2 |
| 2 1/2 & 3 ... 55 | 50 1/2 |
| 3 1/2 to 6 ... 62 1/2 | 54 |
| 7 & 8 ... 61 1/2 | 51 |
| 9 & 10 ... 60 1/2 | 50 |
| 11 & 12 ... 59 1/2 | 49 |

On butt-weld and lap-weld steel pipe jobbers are granted a discount of 5%. On less-than-carload shipments prices are determined by adding 25 and 30% and the carload freight rate to the base card.

Note—Chicago district mills have a base two points less than the above discounts. Chicago delivered base is 2 1/2 points less. Freight is figured from Pittsburgh, Lorain, Ohio, and Chicago district mills, the billing being from the point producing the lowest price to destination.

Boiler Tubes

Seamless Steel Commercial Boiler Tubes and Locomotive Tubes

(Net base prices per 100 ft. f.o.b. Pittsburgh in carload lots)

| | Cold Drawn | Hot Rolled |
|----------------|------------|------------|
| 1 in. o.d. | 13 B.W.G. | \$ 9.46 |
| 1 1/2 in. o.d. | 13 B.W.G. | 9.96 |
| 1 1/2 in. o.d. | 13 B.W.G. | 11.21 |
| 1 1/2 in. o.d. | 13 B.W.G. | 12.38 |
| 1 1/2 in. o.d. | 13 B.W.G. | 14.09 |
| 2 in. o.d. | 13 B.W.G. | 15.78 |
| 2 1/2 in. o.d. | 13 B.W.G. | 17.60 |
| 2 1/2 in. o.d. | 12 B.W.G. | 15.63 |
| 2 1/2 in. o.d. | 12 B.W.G. | 19.37 |
| 2 1/2 in. o.d. | 12 B.W.G. | 21.22 |
| 2 1/2 in. o.d. | 12 B.W.G. | 22.49 |
| 3 in. o.d. | 12 B.W.G. | 23.60 |
| 4 1/2 in. o.d. | 10 B.W.G. | 29.79 |
| 4 1/2 in. o.d. | 10 B.W.G. | 45.19 |
| 5 in. o.d. | 9 B.W.G. | 36.96 |
| 6 in. o.d. | 7 B.W.G. | 56.71 |
| 6 in. o.d. | 7 B.W.G. | 77.35 |

Extra for less-than-carload quantities:

| | |
|--|------|
| 40,000 lb. or ft. or over | Base |
| 30,000 lb. or ft. to 39,999 lb. or ft. | 5% |
| 20,000 lb. or ft. to 29,999 lb. or ft. | 10% |
| 10,000 lb. or ft. to 19,999 lb. or ft. | 20% |
| 5,000 lb. or ft. to 9,999 lb. or ft. | 30% |
| 2,000 lb. or ft. to 4,999 lb. or ft. | 45% |
| Under 2,000 lb. or ft. | 65% |

CAST IRON WATER PIPE

Per Net Ton

| | |
|---|---------|
| *6-in. and larger, del'd Chicago | \$55.00 |
| 6-in. and larger, del'd New York | 53.00 |
| *6-in. and larger, Birmingham | 47.00 |
| 6-in. and larger, f.o.b. dock, San Francisco or Los Angeles | 56.00 |
| F.o.b. dock, Seattle | 56.00 |
| 4-in. f.o.b. dock, San Francisco or Los Angeles | 59.00 |
| F.o.b. dock, Seattle | 59.00 |

Class "A" and gas pipe, \$3 extra
4-in. pipe is \$3 a ton above 6-in.

Prices for lots of less than 200 tons. For 200 tons and over, 6-in. and larger is \$46, Birmingham, and \$54 delivered Chicago; and 4-in. pipe, \$49, Birmingham, and \$58 delivered Chicago.

BOLTS, NUTS, RIVETS, SET SCREWS

Bolts and Nuts

(F.o.b. Pittsburgh, Cleveland, Birmingham or Chicago)

Per Cent Off List

| | |
|--|-------------|
| Machine and carriage bolts: | |
| 1/4 in. x 6 in. and smaller | .65 and 5* |
| Larger and longer up to 1 in. | .60 and 10* |
| 1 1/2 in. and larger | .60 and 5* |
| Lag bolts | .60 and 10* |
| Plow bolts, Nos. 1, 2, 3 and 7 | .65 and 5 |
| Hot pressed nuts, and c.p.c. and t nuts, square or hex. blank or tapped: | |
| 1/4 in. and smaller | .65 |
| 9/16 in. to 1 in. inclusive | .60 and 5 |
| 1 1/2 in. and larger | .60 |

* Less carload lots and less than full container quantity. Less carload lots in full container quantity, an additional 10 per cent discount; carload lots and full container quantity, still another 5 per cent discount.

Semi-finished hexagon nuts, U.S.S. and S.A.E.:

| | |
|-----------------------------|------------|
| 1/4 in. and smaller | .60 and 10 |
| 9/16 in. to 1 in. inclusive | .60 and 5 |
| 1 1/2 in. and larger | .60 |

Stove bolts in packages, nuts attached

| | |
|---------|-------------|
| 9 to 12 | .24 1/2 in. |
| 10 | .70 |
| 12 | .80 |

Stove bolts in packages, with nuts separate

| | |
|---------|-----|
| 9 to 12 | .28 |
| 10 | .80 |

Stove bolts in bulk

| | |
|----|-----|
| 10 | .80 |
|----|-----|

On stove bolts freight is allowed to destination on 200 lb. and over.

Large Rivets

(1/2-in. and larger)

Base per 100 Lb.

F.o.b. Pittsburgh or Cleveland \$3.60
F.o.b. Chicago or Birmingham \$3.70

Small Rivets

(7/16-in. and smaller)

Per Cent Off List

| | |
|-------------------------------|-----------|
| F.o.b. Pittsburgh | .65 and 5 |
| F.o.b. Cleveland | .65 and 5 |
| F.o.b. Chicago and Birmingham | .65 and 5 |

Cap and Set Screws

(Freight allowed up to but not exceeding 65c. per 100 lb. on lots of 200 lb. or more.)

Per Cent Off List

| | |
|--|------------|
| Milled cap screws, 1 in. dia. and smaller | .50 and 10 |
| Milled standard set screws, case hardened, 1 in. dia. and smaller | .75 |
| Milled headless set screws, cut thread 3/4 in. and smaller | .75 |
| Upset hex. head cap screws U.S.S. or S.A.E. thread 1 in. and smaller | .75 |
| Upset set screws, cup and oval points | .75 |
| Milled studs | .65 |

Alloy and Stainless Steel

Alloy Steel Blooms, Billets and Slabs

F.o.b. Pittsburgh, Chicago, Canton, Massillon, Buffalo, Bethlehem.

Base price, \$60 a gross ton.

Alloy Steel Bars

F.o.b. Pittsburgh, Chicago, Buffalo, Bethlehem, Massillon or Canton.

Open-hearth grade, base .30c. Delivered, Detroit .315c.

S.A.E. Series Differential

Numbers per 100 lb.

200 (14% Nickel) .035

2100 (14% Nickel) .075

2300 (3 1/2% Nickel) 1.55

Extra for less-than-carload quantities:

40,000 lb. or ft. or over Base

30,000 lb. or ft. to 39,999 lb. or ft. 5%

20,000 lb. or ft. to 29,999 lb. or ft. 10%

10,000 lb. or ft. to 19,999 lb. or ft. 20%

5,000 lb. or ft. to 9,999 lb. or ft. 30%

2,000 lb. or ft. to 4,999 lb. or ft. 45%

Under 2,000 lb. or ft. 65%

2500 (5% nickel) .225

3100 Nickel-chromium .70

3200 Nickel-chromium .35

3300 Nickel-chromium .38

3400 Nickel-chromium .320

4100 Chromium-molybdenum .55

4100 Chromium-molybdenum .75

4600 Nickel-molybdenum (0.20

to 0.30 Mo, 1.50 to 2.00 Ni) 1.10

5100 Chrome steel (0.60-0.90 Cr.) 0.35

5100 Chrome steel (0.80-1.10 Cr.) 0.45

5100 Chromium spring steel .15

6100 Chromium-vanadium bar .120

6100 Chromium-vanadium spring steel .85

Chromium-nickel-vanadium 1.50

Carbon-vanadium .85

These prices are for hot-rolled steel bars. The differential for most grades in electric furnace steel is 50c. higher. Slabs with a section area of 16 in. and 2 1/2 in. thick or over take the billet base.

CORROSION & HEAT RESISTANT ALLOYS

(Base prices, cents per lb., f.o.b. Pittsburgh)

Chrome-Nickel

No. 304 No. 302

Forging billets .21.25c. 20.40c.

Bars .25c. 24c.

Plates .29c. 27c.

Structural shapes .25c. 24c.

Sheets .36c. 34c.

Hot-rolled strip .23.50c. 21.50c.

Cold-rolled strip .30c. 28c.

Drawn wire

IRON AND STEEL WAREHOUSE PRICES

PITTSBURGH[®]

| | Per Net Ton |
|--|---------------------|
| Plates | 3.70c. |
| Structural shapes | 3.70c. |
| Soft-steel bars and small shapes | 3.80c. |
| Reinforcing steel bars | 2.75c. |
| Cold-finished and screw stock: | |
| Rounds and hexagons | 4.15c. |
| Squares and flats | 4.15c. |
| Hot rolled strip incl. 3/16 in. thick, under 24 in. wide | 4.00c. |
| Hoops | 4.50c. |
| Hot-rolled annealed sheets (No. 24), 10 or more bundles | 4.50c. |
| Galv. sheets (No. 24), 10 or more bundles | 5.15c. |
| Hot-rolled sheets (No. 10) | 3.75c. |
| Galv. corrug. sheets (No. 28), per square (more than 3750 lb.) | \$4.48 |
| Spikes, large | 1 to 24 kegs \$3.75 |
| Track bolts, all sizes per 100 count | 55 |
| Machine bolts, 100 count | ** |
| Carriage bolts, 100 count | ** |
| Nuts, all styles, 100 count | ** |
| Large rivets, base per 100 lb. | \$4.35 |
| Wire, black, soft ann'l'd, base per 100 lb. | 3.45c. |
| Wire, galv. soft, base per 100 lb. | 3.85c. |
| Common wire nails, per keg | 3.00c. |
| Cement coated nails, per keg | 3.00c. |

On plates, structural, bars, reinforcing bars, bands, hoops and blue annealed sheets, base applies to orders of 400 to 3999 lb.

* Delivered in Pittsburgh switching district.

** Prices on application.

CHICAGO Base per Lb.

| | |
|--|-----------------|
| Plates and structural shapes | 3.75c. |
| Soft steel bars, rounds | 3.85c. |
| Soft steel bars, squares and hexagons | 4.00c. |
| Cold-fin. steel bars: | |
| Rounds and hexagons | 4.30c. |
| Flats and squares | 4.30c. |
| Hot-rolled strip | 4.10c. |
| Hot-rolled annealed sheets (No. 24) | 4.60c. |
| Galv. sheets (No. 24) | 5.25c. |
| Spikes (keg lots) | \$4.40 |
| Track bolts (keg lots) | 5.05 |
| Rivets, structural (keg lots) | **4.95 |
| Rivets, boiler (keg lots) | **5.05 |
| Per Cent Off List | |
| Machine bolts and carriage bolts, 1/2 in. and smaller | 60 |
| Lag screws | *55 and 5 |
| Hot-pressed nuts, sq. and hex., tap or blank, 1/2 by 6 in. and smaller | 60 |
| Hex. head cap screws | 60 |
| Cut point set screws | 75 |
| Flat head bright wood screws | 62 and 20 |
| Spring coppers | 45 |
| Stove bolts in full packages | 72 1/2 |
| Rd. hd. tank rivets, 7/16 in. and smaller | 55 |
| Wrought washers | \$4.00 off list |
| Black ann'l'd wire per 100 lb. to mfg. trade (No. 14 and heavier) | \$4.55 |
| Cm. wfre. nails, 15 kegs or more, per keg | \$3.20 |
| Cement c't'd. nails, 15 kegs or more, per keg | \$3.20 |

On plates, shapes, bars, hot-rolled strip and heavy hot-rolled sheets, the base applies on orders of 400 to 3999 lb. All prices are f.o.b. consumers' plants within the Chicago switching district.

* These are quotations delivered to city trade for quantities of 100 lb. or more. For lots of less than 100 lb., the quotation is 60 per cent off. Discounts applying to country trade are 70 per cent off, f.o.b. Chicago, with full or partial freight allowed up to 50c. per 100 lb.

** Base at 100 lb.

NEW YORK

| | Base per Lb. |
|---|----------------|
| Plates, 1/4 in. and heavier | 4.00c. |
| Structural shapes | 3.97c. |
| Soft steel bars, round | 4.12c. |
| Iron bars, Swed. char-coal | 7.25 to 7.50c. |
| Cold-fin. shafting and screw stock: | |
| Rounds and hexagons | 4.57c. |
| Flats and squares | 4.57c. |
| Cold-rolled; strip, soft and quarter hard | 3.92c. |
| Hoops | 4.32c. |

| | |
|--|-------------------|
| Bands | 4.32c. |
| Hot-rolled sheets (No. 10) | 4.00 to 4.07c. |
| Hot-rolled ann'l'd sheets (No. 24) | 4.50 to 4.82c. |
| Galvanized sheets (No. 24*) | 5.00c. |
| Long terne sheets (No. 24) | 5.50 to 6.20c. |
| Armco iron, galv. (No. 24†) | 6.25c. |
| Toncan iron, galv. (No. 24†) | 6.25c. |
| Galvanneal (No. 24†) | 6.50c. |
| Armco iron, hot-rolled annealed (No. 24†) | 5.65c. |
| Toncan iron, hot-rolled annealed (No. 24†) | 5.65c. |
| Armco iron hot-rolled (No. 10†) | 4.60c. |
| Toncan iron, hot-rolled (No. 10†) | 4.60c. |
| Cold-rolled sheets (No. 20) for quantities 400 to 1499 lb. | |
| Standard quality | 5.40c. |
| Deep drawing | 6.05c. |
| Stretcher leveled | 6.05c. |
| SAE, 2300, hot-rolled | 7.82c. |
| SAE, 3100, hot-rolled | 6.37c. |
| SAE, 6100, hot-rolled, annealed | 10.52c. |
| SAE, 2300, cold-rolled | 9.00c. |
| SAE, 3100, cold-rolled, annealed | 8.55c. |
| Floor plate, 1/4 in. and heavier | 5.60c. |
| Standard tool steel | 12.50c. |
| Wire, black, annealed (No. 9) | 4.65c. |
| Wire, galv. (No. 9) | 5.00c. |
| Tire steel, 1 x 1/2 in. and larger | 4.61c. |
| Open-hearth spring steel | 4.75c. to 10.25c. |
| Common wire nails, base per keg | 3.25c. |

| | |
|---|-----------------------|
| Per Cent Off List | |
| Machine bolts, square head and nut: All diameters | Prices on application |
| Carriage bolts, cut thread: All diameters | Prices on application |

| | |
|---|--|
| * For 1500 lb. or more; add 0.25c. on smaller lots. No. 28 and lighter, 36 in. wide, 20c. per 100 lb. higher. | |
|---|--|

ST. LOUIS

| | Base per Lb. |
|---|--------------|
| Plates and struc. shapes | 3.99c. |
| Bars, soft steel (rounds and flats) | 4.09c. |
| Bars, soft steel (squares, hexagons, ovals, half ovals and half rounds) | 4.24c. |
| Cold-fin. rounds, shafting, screw stock | 4.54c. |
| Hot-rolled annealed sheets (No. 24) | 4.84c. |
| Galv. sheets (No. 24) | 5.49c. |
| Hot-rolled sheets (No. 10) | 4.09c. |
| Black corrug. sheets (No. 24*) | 4.89c. |
| 2 galv. corrug. sheets | 5.54c. |
| Structural rivets | 5.29c. |
| Bolier rivets | 5.39c. |

| | Per Cent Off List |
|---|-------------------|
| Tank rivets, 7/16 in. and smaller | 50 |
| Machine and carriage bolts, lag screws, fitting up bolts, bolt ends, plow bolts, hot-pressed nuts, square and hexagon, nuts; all quantities | 60 |
| * No. 26 and lighter take special prices. | |

PHILADELPHIA

| | Base per Lb. |
|--|--------------|
| *Plates, 1/4-in. and heavier | 3.90c. |
| *Structural shapes | 3.90c. |
| *Soft steel bars, small shapes, iron bars (except bands) | 4.00c. |
| †Reinforce. steel bars, square and deformed | 3.53c. |
| Cold-finished steel bars | 4.53c. |
| *Steel hoops | 4.35c. |
| *Steel bands, No. 12 and 3/16 in. incl. | 4.10c. |
| *Spring steel | 5.50c. |
| †Hot-rolled anneal. sheets (No. 24) | 4.65c. |
| †Galvanized sheets (No. 24) | 5.30c. |
| *Hot-rolled annealed sheets (No. 10) | 4.00c. |
| *Diam. pat. floor plates, 1/4 in. | 5.25c. |

These prices are for delivery in Philadelphia trucking area.

* Base prices subject to deduction on orders aggregating 4000 lb. or over.

† For 25 bundles or over.

‡ For less than 2000 lb.

CLEVELAND

| | Base per Lb. |
|--------------------------|--------------|
| Plates and struc. shapes | 3.86c. |
| Soft steel bars | 3.75c. |

| | |
|--|--------|
| Reinforce. steel bars | 2.50c. |
| Cold-finished steel bars | 4.30c. |
| Hot-rolled strip, 6 in. wide and under | 4.16c. |
| Cold-finished strip | 3.60c. |
| Hot-rolled annealed sheets (No. 24) | 4.66c. |
| Galvanized sheets (No. 24) | 5.31c. |
| Hot-rolled sheets (No. 10) | 3.91c. |
| Hot-rolled 3/16 in. 24 to 48 in. wide sheets | 3.91c. |
| Floor plates, 3/16 in. and heavier | 5.76c. |
| Black ann'l'd wire, per 100 lb. | \$3.40 |
| No. 9 galv. wire, per 100 lb. | 3.30 |
| Com. wire nails, base per keg | 2.95 |

| | Per Cent Off List |
|-----------------------------------|-------------------|
| Machine and carriage bolts, small | 65 and 5 |
| Large | 60 and 10 |
| Nuts, 100 count | 5 and 5 |
| 1/2 in. and smaller | 65 and 5 |
| 9/16 in. to 1 in. | 60 and 10 |

† Outside delivery 10c. less.

* For 5000 lb. or less.

‡ Plus switching and carriage charges and quantity differentials up to 50c.

CINCINNATI

| | Base per Lb. |
|--|--------------------------------------|
| Plates and struc. shapes | 3.95c. |
| Floor plates | 5.55c. |
| Bars, rounds, flats and angles | 4.05c. |
| Other shapes | 4.20c. |
| Rail steel reinforce. bars | 3.75 |
| Hoops and bands, 3/16 in. and lighter | 4.25c. |
| Cold-finished bars | 4.50c. |
| Hot-rolled annealed sheets (No. 24) 3500 lb. or more | 4.60c. |
| Galv. sheets (No. 24) 3500 lb. or more | \$5.25 |
| Hot-rolled sheets (No. 10) | 4.00c. |
| Small rivets | 55 per cent off list |
| No. 9 ann'l'd wire, per 100 lb. (1000 lb. or over) | \$3.48 |
| Com. wire nails, base per keg | Any quantity less than carload, 3.20 |
| Cement c't'd. nails, base 100-lb. keg | 3.50 |
| Chain, lin. per 100 lb. | 8.35 |

BUFFALO Base per Lb.

| | |
|---|--------|
| Plates | 3.92c. |
| Floor plates | 5.52c. |
| Struc. shapes | 3.80c. |
| Soft steel bars | 3.90c. |
| Reinforcing bars | 3.10c. |
| Cold-fin. flats and sq. | 4.35c. |
| Rounds and hex. | 4.35c. |
| Cold-rolled strip steel | 3.79c. |
| Hot-rolled annealed sheets (No. 24) | 4.80c. |
| Heavy hot-rolled sheets (3/16 in. 24 to 48 in. wide) | 3.97c. |
| Galv. sheet (No. 24) | 5.45c. |
| Bands | 4.22c. |
| Hoops | 4.22c. |
| Heavy hot-rolled sheets | 3.97c. |
| Com. wire nails, base per keg | \$3.26 |
| Black wire, base per 100 lb. (2500-lb. lots or under) | 4.55c. |
| (Over 2500 lb.) | 4.45c. |

BOSTON Base per Lb.

| | |
|--|--------------|
| Channels, angles | 4.20c. |
| Tees and zees, under 3 in. | 4.45c. |
| H beams and shapes | 4.07c. |
| Plates — Sheared, tank and univ. mill, 1/4 in. thick and heavier | 4.08c. |
| Floor plates, diamond pattern | 5.13c. |
| Bar and bar shapes (mild steel) | 4.20c. |
| Bands 3/16 in. thick and No. 12 ga. incl. | 4.40 to 5.40 |
| Half rounds, half ovals, ovals and bevels | 5.45c. |
| Tire steel | 5.45c. |
| Cold-rolled strip steel | 3.845c. |
| Cold-finished rounds, squares and hexagons | 4.65c. |
| Cold-finished flats | 4.65c. |
| Blue annealed sheets, No. 10 ga. | 3.90c. |
| One pass cold-rolled sheets No. 24 ga. | 4.50c. |
| Galvanized steel sheets, No. 24 ga. | 5.05c. |
| Lead coated sheets, No. 24 ga. | 6.15c. |

Price delivered by truck in metropolitan Boston, subject to quantity differentials.

DETROIT

Base per Lb.

| | |
|--|--------|
| Soft steel bars | 3.49c. |
| Structural shapes | 3.95c. |
| Plates | 3.95c. |
| Floor plates | 5.85c. |
| Hot-rolled annealed sheets (No. 24)* | 4.69c. |
| Hot-rolled sheets (No. 10) | 3.94c. |
| Galvanized sheets (No. 24)* | 5.40c. |
| Bands and hoops | 4.19c. |
| Cold-finished bars | 4.30c. |
| Cold-rolled strip | 3.78c. |
| Hot-rolled alloy steel (S.A.E. 3100 Series) | 6.44c. |

Quantity differential on bars, plates, structural shapes, bands, hoops, floor plates and heavy hot-rolled: Under 100 lb., 1.50c. over base; 100 to 399 lb., base plus .50c.; 400 to 3999 lb., base; 4000 to 9999 lb., base less .10c.; 10,000 lb. and over, less .15c.

*Under 400 lb., .50c. over base, 400 to 1499 lb., base; 1500 to 3499 lb., base less .10c.; 3500 lb. and over, base less .15c.

Prices delivered by truck in metropolitan Detroit, subject to quantity differentials covering shipment at one time.

Galvanized and hot-rolled annealed may not be combined to obtain quantity deductions.

MILWAUKEE

Base per Lb.

| | |
|--|--------|
| Plates and structural shapes | 3.86c. |
| Soft steel bars, rounds up to 8 in., flats and fillet angles | 3.96c. |
| Soft steel bars, squares and hexagons | 4.11c. |
| Hot-rolled strip | 4.21c. |
| Hot-rolled annealed sheets (No. 24) | 4.71c. |
| Galvanized sheets (No. 24) | 5.36c. |
| Cold-finished steel bars | 4.41c. |
| Structural rivets (keg lots) | 5.16c. |
| Boiler rivets, cone head (keg lots) | 5.26c. |
| Track spikes (keg lots) | 4.81c. |
| Track bolts (keg lots) | 5.81c. |
| Black annealed wire (No. 6 to No. 9 incl.) | 4.05c. |
| Com. wire nails and cement coated nails 1 to 14 kegs | 3.25c. |

Per Cent Off List

| | |
|---|--------|
| Machine bolts and carriage bolts, 1/2x6 and smaller or shorter | 65 |
| Larger and longer up to 1 in., diam. | 60-5 |
| 1 1/2 in. and larger | 60 |
| Coach and lag screws | 60-5 |
| Hot-pressed nuts, sq. and hex. tapped or blank, 1-199 lb. | 50 |
| 200 lb. and over: 1/2 in. and smaller | 62 1/2 |
| 9/16 to 1 in. | 60 |
| 1 1/2 in. and over | 50 |

Prices given above are delivered Milwaukee.

On plates, shapes, bars, hot-rolled strip and heavy hot-rolled sheets, the base applies on orders of 400 to 3999 lb. On galvanized and No. 24 hot-rolled annealed sheets the prices given apply on orders of 400 to 1500 lb. On cold-finished bars the prices are for orders of 1000 lb. or more of a size.

ST. PAUL

Base per Lb.

| | |
|---------------------------------------|--------|
| Mild steel bars, rounds | 4.10c. |
| Structural shapes | 4.00c. |
| Plates | 4.00c. |
| Cold-finished bars | 4.55c. |
| Hot-rolled annealed sheets, No. 24 | 4.85c. |
| Galvanized sheets, No. 24 | 5.50c. |

On mild steel bars, shapes and plates the base applies on 400 to 14,999 lb. On hot-rolled sheets, galvanized sheets and cold-rolled sheets base applies on 15,000 lb. and over. Base on cold-finished bars is 1000 lb. and over of a size.

BIRMINGHAM

| | |
|------------------------------|--------------------------|
| Bars and bar shapes | \$3.85 base |
| Structural shapes and plates | 3.75 " |
| Hot rolled sheets No. 10 ga. | 3.80 " |
| Hot rolled sheets No. 24 ga. | 4.40 " 3500 lb. and over |
| Galvanized sheets No. 24 ga. | 5.05 " 3500 lb. or more |
| Strip | 4.05 " |
| Reinforcing bars | 3.85 " |
| Floor plates | 5.96 " |
| Cold finished bars | 4.91 " |
| Machine and carriage bolts | 50 & 10 off list |
| Rivets (structural) | \$4.60 base |

On plates, shapes, bars, hot rolled strip, heavy hot rolled sheets, the base applies on 400 to 3999 lb. All prices are f.o.b. consumer's plant.

BALTIMORE

Base per Lb.

| | |
|--|--------|
| Mild steel bars and small shapes | 4.00c. |
| Structural shapes | 3.90c. |
| Reinforcing bars, 5 to 15 tons | 3.16c. |
| Plates | 3.90c. |
| Hot-rolled sheets, No. 10 | 3.95c. |
| Bands | 4.20c. |
| Hoops | 4.45c. |
| Special threading steel | 4.15c. |
| Checkered floor plates 3/4 in. and heavier | 5.50c. |
| Galvanized sheets, No. 24, 100 bbls. or more | \$4.70 |
| Cold-rolled rounds, hexagons, squares and flats, 1000 lb. and more | 4.50c. |

On plates, shapes, bars, hot-rolled strip and heavy hot-rolled sheets the base applies on orders 400 to 3999 lb. All prices are f.o.b. consumers' plants.

For second zone add 10c. per 100 lb. for trucking.

CHATTANOOGA

Base per Lb.

| | |
|-------------------------------------|--------|
| Mild steel bars | 4.21c. |
| Iron bars | 4.21c. |
| Reinforcing bars | 4.21c. |
| Reinforcing shapes | 4.11c. |
| Plates | 4.11c. |
| Hot-rolled sheets No. 10 | 4.16c. |
| Hot-rolled annealed sheets, No. 24* | 4.06c. |
| Galvanized sheets No. 24* | 4.76c. |
| Steel bands | 4.41c. |
| Cold-finished bars | 4.86c. |

* Plus mill item extra.

MEMPHIS

Base per Lb.

| | |
|-------------------------------------|--------|
| Mild steel bars | 4.31c. |
| Shapes, bar size | 4.31c. |
| Iron bars | 4.31c. |
| Structural shapes | 4.21c. |
| Plates | 4.21c. |
| Hot-rolled sheets, No. 10 | 4.26c. |
| Hot-rolled annealed sheets, No. 24* | 4.91c. |
| Galvanized sheets, No. 24 | 5.66c. |
| Steel bands | 4.56c. |
| Cold-drawn rounds | 4.80c. |
| Cold-drawn flats, squares, hexagons | 6.80c. |
| Structural rivets | 5.15c. |
| Bolts and nuts, per cent off list | 55 |
| Small rivets, per cent off list | 55 |

NEW ORLEANS

Base per Lb.

| | |
|-----------------------------------|--------|
| Mild steel bars | 4.20c. |
| Reinforcing bars | 3.24c. |
| Structural shapes | 4.10c. |
| Plates | 4.10c. |
| Hot-rolled sheets, No. 10 | 4.35c. |
| Steel bands | 4.75c. |
| Cold-finished steel bars | 5.10c. |
| Structural rivets | 4.85c. |
| Boiler rivets | 4.85c. |
| Common wire nails, base per keg | \$3.55 |
| Bolts and nuts, per cent off list | 60 |

PACIFIC COAST

Base per Lb.

| | San Fran- | Los Angeles | Seattle |
|---|-------------|-------------|---------|
| Plates, tank and U. M. | 4.05c. | 4.30c. | 4.25c. |
| Shapes, standard | 4.05c. | 4.30c. | 4.25c. |
| Soft steel bars | 4.20c. | 4.30c. | 4.45c. |
| Reinforcing bars, f.o.b. cars dock | | | |
| Pacific ports | 2.975c. | 2.975c. | 3.625c. |
| Hot-rolled annealed sheets (No. 24) | 5.15c. | 5.05c. | 5.35c. |
| Hot-rolled sheets (No. 10) | 4.30c. | 4.50c. | 4.50c. |
| Rivets (structural) | \$4.60 base | | |
| Galv. sheets (No. 24 and lighter) | 5.85c. | 5.55c. | 5.90c. |
| Galv. sheets (No. 22 and heavier) | 6.10c. | 5.70c. | 5.90c. |
| Cold-finished steel | | | |
| Rounds | 6.80c. | 6.85c. | 7.10c. |
| Squares and hexagons | 8.05c. | 8.10c. | 7.10c. |
| Flats | 8.55c. | 8.60c. | 8.10c. |
| Common wire nails—base per keg less carload | \$3.40 | \$3.40 | \$3.40 |

All items subject to differentials for quantity.

REFRACTORIES PRICES

Fire Clay Brick

Per 1000 f.o.b. Works

| | |
|---|---------|
| First quality, Pennsylvania, Maryland, Kentucky, Missouri and Illinois | \$54.00 |
| First quality, New Jersey | 56.00 |
| Select, Ohio | 49.00 |
| Second quality, Pennsylvania, Maryland, Kentucky, Missouri and Illinois | 49.00 |
| Second quality, New Jersey | 51.00 |
| No. 1, Ohio | 46.00 |
| Ground fire clay, per ton | 8.00 |

5 per cent trade discount on fire clay brick, except for New Jersey, quoted at net price.

Silica Brick

Per 1000 f.o.b. Works

| | |
|-------------------------------------|---------|
| Pennsylvania | \$54.00 |
| Chicago District | 63.00 |
| Birmingham | 54.00 |
| Silica cement per net ton (Eastern) | 9.50 |

5 per cent trade discount on silica brick.

Chrome Brick

Per Net Ton

| | |
|---|---------|
| Standard f.o.b. Baltimore, Plymouth Meeting and Chester | \$49.00 |
| Chemically bonded f.o.b. Baltimore, Plymouth Meeting and Chester, Pa. | 49.00 |

Magnesite Brick

Per Net Ton

| | |
|---------------------------------------|---------|
| Standard f.o.b. Baltimore and Chester | \$69.00 |
| Chemically bonded f.o.b. Baltimore | 59.00 |

Grain Magnesite

Per Net Ton

| | |
|--|---------|
| Imported, f.o.b. Baltimore and Chester, Pa. (in sacks) | \$45.00 |
| Domestic, f.o.b. Baltimore and Chester, in sacks | 43.00 |
| Domestic, f.o.b. Chewelah, Wash | 25.00 |

RAW MATERIALS PRICES

PIG IRON

No. 2 Foundry

| | |
|--|---------|
| F.o.b. Everett, Mass. | \$25.75 |
| F.o.b. Bethlehem, Birdsboro and Swedeland, Pa., and Sparrows Point, Md. | 25.00 |
| Delivered Brooklyn | 27.47 |
| Delivered Newark or Jersey City | 26.53 |
| Delivered Philadelphia | 25.84 |
| F.o.b. Neville Island, Sharpsville and Erie, Pa.; Buffalo, Youngstown, Cleveland, Toledo and Hamilton, Ohio; Detroit, Chicago and Granite City, Ill. | 24.00 |
| F.o.b. Jackson, Ohio | 25.75 |
| Delivered Cincinnati | 24.27 |
| F.o.b. Duluth | 24.50 |
| F.o.b. Provo, Utah | 22.00 |
| Delivered San Francisco, Los Angeles or Seattle | 26.50 |
| F.o.b. Birmingham | 20.38 |

* Delivered prices on southern iron for shipment to northern points are 38c. a ton below delivered prices from nearest northern basing point on iron with phosphorus content of 70 and over.

Malleable

Base prices on malleable iron are 5c. a ton above No. 2 foundry quotations at Everett, Eastern Pennsylvania furnaces, Erie and Buffalo. Elsewhere they are the same.

Basic

| | |
|---|---------|
| F.o.b. Everett, Mass. | \$25.25 |
| F.o.b. Bethlehem, Birdsboro, Swedeland and Steelton, Pa., and Sparrows Point, Md. | 24.50 |
| F.o.b. Buffalo | 23.00 |
| F.o.b. Neville Island, Sharpsville and Erie, Pa.; Youngstown, Cleveland, Toledo and Hamilton, Ohio; Detroit; Chicago and Granite City, Ill. | 23.50 |
| Delivered Cincinnati | 24.61 |
| Delivered Canton, Ohio | 24.89 |
| Delivered Mansfield, Ohio | 25.44 |
| F.o.b. Jackson, Ohio | 25.50 |
| F.o.b. Birmingham | 19.00 |

Bessemer

| | |
|--|---------|
| F.o.b. Everett, Mass. | \$26.75 |
| F.o.b. Bethlehem, Birdsboro and Swedeland, Pa. | 26.00 |
| Delivered Boston Switching District | 26.50 |
| Delivered Newark or Jersey City | 27.53 |
| Delivered Philadelphia | 26.76 |
| F.o.b. Buffalo and Erie, Pa., and Duluth | 25.00 |
| F.o.b. Neville Island and Sharpsville, Pa.; Youngstown, Cleveland, Toledo and Hamilton, Ohio; Detroit; Chicago | 24.50 |
| F.o.b. Birmingham | 25.00 |
| Delivered Cincinnati | 25.61 |
| Delivered Canton, Ohio | 25.89 |
| Delivered Mansfield, Ohio | 25.44 |
| F.o.b. Jackson, Ohio | 25.50 |
| F.o.b. Birmingham | 19.00 |

Low Phosphorus

| | |
|---|---------|
| Basing points: Birdsboro, Pa., Steelton, Pa., and Standish, N. Y. | \$28.50 |
|---|---------|

Gray Forge

| | |
|------------------------------|---------|
| Valley or Pittsburgh furnace | \$23.50 |
|------------------------------|---------|

Charcoal

| | |
|-----------------------|---------|
| Lake Superior furnace | \$27.00 |
|-----------------------|---------|

| | |
|-------------------|-------|
| Delivered Chicago | 30.24 |
|-------------------|-------|

Canadian Pig Iron

Per Gross Ton

| | |
|-------------------------------|---------|
| Delivered Toronto | |
| No. 1 fdy., sil. 2.25 to 2.75 | \$26.50 |
| No. 2 fdy., sil. 1.75 to 2.25 | 25.50 |
| Malleable | 26.00 |
| Basic | 25.50 |
| Delivered Montreal | |
| No. 1 fdy., sil. 2.25 to 2.75 | \$27.50 |
| No. 2 fdy., sil. 1.75 to 2.25 | 27.00 |
| Malleable | 27.50 |
| Basic | 27.00 |

FERROALLOYS

Ferromanganese

| | |
|---|--|
| F.o.b. New York, Philadelphia, Baltimore, Mobile or New Orleans | |
| Per Gross Ton | |

| | |
|-------------------------|----------|
| Domestic, 80% (carload) | \$102.50 |
|-------------------------|----------|

Spiegeleisen

Per Gross Ton Furnace

| | |
|---------------------|---------|
| Domestic, 19 to 21% | \$33.00 |
| F.o.b. New Orleans | 33.00 |

Electric Ferrosilicon

Per Gross Ton Delivered

| | |
|----------------|---------|
| 50% (carloads) | \$69.50 |
| 50% (ton lots) | 77.00 |
| 75% (carloads) | 126.00 |
| 75% (ton lots) | 136.00 |

Silvery Iron

Per Gross Ton

| | |
|-------------------------------------|---------|
| F.o.b. Jackson, Ohio, 5.00 to 5.50% | \$27.50 |
|-------------------------------------|---------|

For each additional 0.5% silicon up to 17%. 50c. a ton is added.

The lower all-rail delivered price from Jackson or Buffalo is quoted with freight allowed. Base prices at Buffalo are \$1.25 a ton higher than at Jackson.

Manganese, each unit over 2%, \$1 a ton additional. Phosphorus 0.75% or over, \$1 a ton additional.

Base prices at Buffalo are \$1.25 a ton higher than at Jackson.

Bessemer Ferrosilicon

F.o.b. Jackson, Ohio, Furnace

Per Gross Ton

| | |
|-----------------|---------|
| 10.00 to 10.50% | \$33.50 |
| 10.51 to 11.00% | 34.00 |
| 11.01 to 11.50% | 34.50 |
| 11.51 to 12.00% | 35.00 |
| 12.01 to 12.50% | 35.50 |
| 12.51 to 13.00% | 36.00 |
| 13.01 to 13.50% | 36.50 |
| 13.51 to 14.00% | 37.00 |
| 14.01 to 14.50% | 37.50 |
| 14.51 to 15.00% | 38.00 |
| 15.01 to 15.50% | 38.50 |
| 15.51 to 16.00% | 39.00 |
| 16.01 to 16.50% | 39.50 |
| 16.51 to 17.00% | 40.00 |

Manganese 2 to 3%, \$1 a ton additional. For each unit of manganese over 3%, \$1 a ton additional. Phosphorus 0.75% or over, \$1 a ton additional.

Base prices at Buffalo are \$1.25 a ton higher than at Jackson.

Other Ferroalloys

Ferrotungsten, per lb. contained W del., carloads, nominally

\$1.80

Ferrotungsten, lots of 500 lbs., nominally

1.85

Ferrotungsten, smaller lots, nominally

1.90

Ferrochromium, 4 to 6% carbon and up, 65 to 70% Cr per lb. contained Cr delivered, in carloads and contract

10.50c.

Ferrochromium, 2% carbon

16.50c. to 17.00c.

Ferrochromium, 1% carbon

17.50c. to 18.00c.

Ferrochromium, 0.10% carbon

19.50c. to 20.00c.

Ferrochromium, 0.06% carbon

20.00c. to 20.50c.

Ferrovanadium, del. per lb. contained V

\$2.70 to \$2.90

Ferrocolumbium, per lb. contained columbium, f.o.b. Niagara Falls, N. Y.

\$2.50*

Ferrocarbontitanium, 15 to 18% Ti, 7 to 8% C, f.o.b. furnace carload and contract per net ton

\$142.50

Ferrocarbontitanium, 17 to 20% Ti, 3 to 5% C, f.o.b. furnace carload and contract, per net ton

\$157.50

Ferrophosphorus, electric, or blast furnace material, in carloads, f.o.b. Anniston, Ala., for 18%, with \$3 unitage, freight equalized with Rockdale, Tenn., per gross ton

63.50

Ferrophosphorus, electrolytic, 23-26% in car lots, f.o.b. Monsanto (Siglo), Tenn., 24%, per gross ton, \$3 unitage, freight equalized with Nashville

80.00

Ferromolybdenum, per lb. Mo del

95c.

Calcium molybdate, per lb. Mo del

80c.

Silico spiegel, per ton, f.o.b. furnace, carloads

\$45.00

Ton lots or less, per ton

50.00

Silico-manganese, gross ton, delivered

3%

101.50

2.50% carbon grade

106.50

2% carbon grade

111.50

1% carbon grade

121.50

* Spot prices are \$5 a ton higher. Spot premium on 75 per cent ferrosilicon is \$10 a ton.

ORES

Lake Superior Ores

Delivered Lower Lake Ports

Per Gross Ton

Old range, Bessemer, 51.50% \$5.25

Old range, non-Bessemer, 51.50% 5.10

Mesabi, Bessemer, 51.50% 5.10

Mesabi, non-Bessemer, 51.50% 4.95

High phosphorus, 51.50% 4.85

Foreign Ore

C.i.f. Philadelphia or Baltimore

Per Unit

Iron, low phosphorus, copper free, 55 to 58% dry, Algeria, nominal 17.90c.

Iron, low phosphorus, Swedish, average, 68 1/2% iron, nominal

Iron, basic or foundry, Swedish, average, 65% iron, nominal

Iron, basic or foundry, Russian, average, 65% iron, nominal

Man., Caucasian, washed 52% 50c.

Man., African, Indian, 44-48% nominal

Man., African, Indian, 49-51% nominal

Man., Brazilian, 46 to 48 1/2% nominal

Per Net Ton Unit

Tungsten, Chinese, wolframite, duty paid, delivered \$24.50

Tungsten, domestic, scheelite delivered \$23.50 to \$25.50

Chrome ore (lump) c.i.f. Atlantic Seaboard, per gross ton:

South African (low grade) \$16.00

Rhodesian, 45% 22.00

Rhodesian, 48% 25.50

Turkish, 48-49% 25.00 to \$26.00

Turkish, 45-46% 23.00 to 23.50

Turkish, 44% 19.00 to 19.50

Chrome concentrates (Turkish) c.i.f. Atlantic Seaboard, per gross ton:

50% \$25.50 to \$26.50

48-49% 24.50 to 25.00

FLUORSPAR

Per Net Ton

Domestic, washed gravel, 85-5, f.o.b. Kentucky and Illinois mines, all rail \$20.00

Domestic, barge and rail 21.50

No. 2 lump, 85-5, f.o.b. Kentucky and Illinois mines 22.00

Foreign, 85% calcium, fluoride, not over 5% silicon, c.i.f. Atlantic ports, duty paid 24.50

Domestic No. 1 ground bulk, 95 to 98% calcium fluoride, not over 2 1/2% silicon, f.o.b. Illinois and Kentucky mines 31.50

COKE

Per Net Ton

Furnace, f.o.b. Connellsville, Prompt \$4.00 to \$4.25

Foundry, f.o.b. Connellsville, Prompt 5.00 to 6.25

Foundry, by-product, Chicago ovens 10.25

Foundry, by-product, del'd New England 12.50

Foundry, by-product, del'd Newark or Jersey City 10.88 to 11.40

Foundry, by-product, Philadelphia 10.95

Foundry, by-product, delivered Cleveland 11.05



For
High Quality
STEELS

NIAGARA BRAND
FERRO-ALLOYS

FERRO SILICON
ALL GRADES

FERRO CHROMIUM
HIGH CARBON

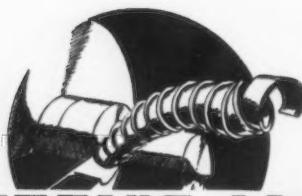
FERRO CHROMIUM
LOW CARBON

FERRO MANGANESE
SILICO MANGANESE

PITTSBURGH METALLURGICAL CO., Inc.

NIAGARA FALLS, N.Y.

Sales Offices: NEW YORK—30 Church St. • PITTSBURGH—Oliver Bldg. • CLEVELAND—Hanna Bldg.



THIS WEEK'S MACHINE ...TOOL ACTIVITIES...

... December order volume rapidly reaching a standstill.

• • •

... Volume of inquiries received and quotations made on proposals indicate an encouraging pickup in January.

• • •

... Foreign inquiries and orders continue to come out in volume and are maintaining backlog.

Cleveland

THE machine tool industry is looking forward to January with expectation of a decided improvement in the market, in which activity at present is almost at a standstill. Orders for 12 new and used machines were placed during the week for equipping a newly organized northern Ohio plant, but with this exception no new business is reported by Cleveland dealers. Manufacturers do not look for any life in the domestic market until after the first of the year. Planning to purchase new equipment for its Cleveland plant in January, the Westinghouse Electric & Mfg. Co. has issued an inquiry for a heavy-duty drill, one or two drill presses, one drill grinder, one degreasing machine, two large molding machines, one sandblast table and one industrial oven.

New foreign inquiries include one for 213 either new or slightly used tools, this inquiry having been sent out by D. Hadjopoulos, 24 Stone Street, New York. This list includes various types of lathes, drilling and grinding machines and also lapping, punching and shearing machines.

Chicago

ONLY a few straggling orders are being received by machinery sellers currently, but there seems to be no further downward movement in activity. It is expected that business will remain at present levels for several weeks at least, since few statements have been made by buyers as to their immediate course of action in 1938, and it is not believed that sufficient change in conditions will occur to warrant much of an increase in machinery orders very early in the year. Interest is centered on the \$1,000,000 tractor addition at the Chicago plant of Inter-

national Harvester Co. which is expected to be completed in May, 1938. Company officials state that although some tools, of course, will be purchased, not a great deal of new machinery will be necessary. The Peru Wheel Co., Peru, Ill., is planning to remodel a building at Galesburg, Ill., for tractor production.

Pittsburgh

FROM present indications December machine tool business will be below the volume booked in November. Orders have slowed up during the past few weeks. Inquiries, however, although not as numerous as during the early part of the month, are holding up fairly well. Deliveries are considerably easier than was the case a few months ago, but the majority of machine tool manufacturers are fairly well booked into the first quarter of 1938.

New York

WHATEVER business there has been transacted this month will probably have been placed in the first half, as no one anticipates the receipt of many orders this week or next. December volume to date has been low, so that the month will go down as the lowest this year for most dealers and factory representatives. Some proposals have been worked up to the point where prices are being quoted, but how soon order action will follow is very problematical, for the most part not until after the first of the year.

In some lines deliveries are very prompt, three to four weeks being quoted for standard types of milling machines, but not every manufacturer is in this position. For many, deliveries are about as extended as earlier

in the fall, since backlog are being sustained by the influx of foreign orders. Japanese orders continue to flow in, and the Russians have been buying some very large machinery lately for the manufacture of large caliber guns. Lathes with beds 90 ft. long have been ordered.

Detroit

A BRIGHTER outlook based on inquiries and proposals already submitted to automobile manufacturers was reported in the machine tool centers of Detroit during the last week. A new General Motors truck engine with overhead valves will be in production before long, since proposals have already been submitted for manufacturing equipment. Two new passenger car engines in the General Motors line are in the process of development. The Federal Motor Truck Co. will start production this week on its 1938 models.

Cincinnati

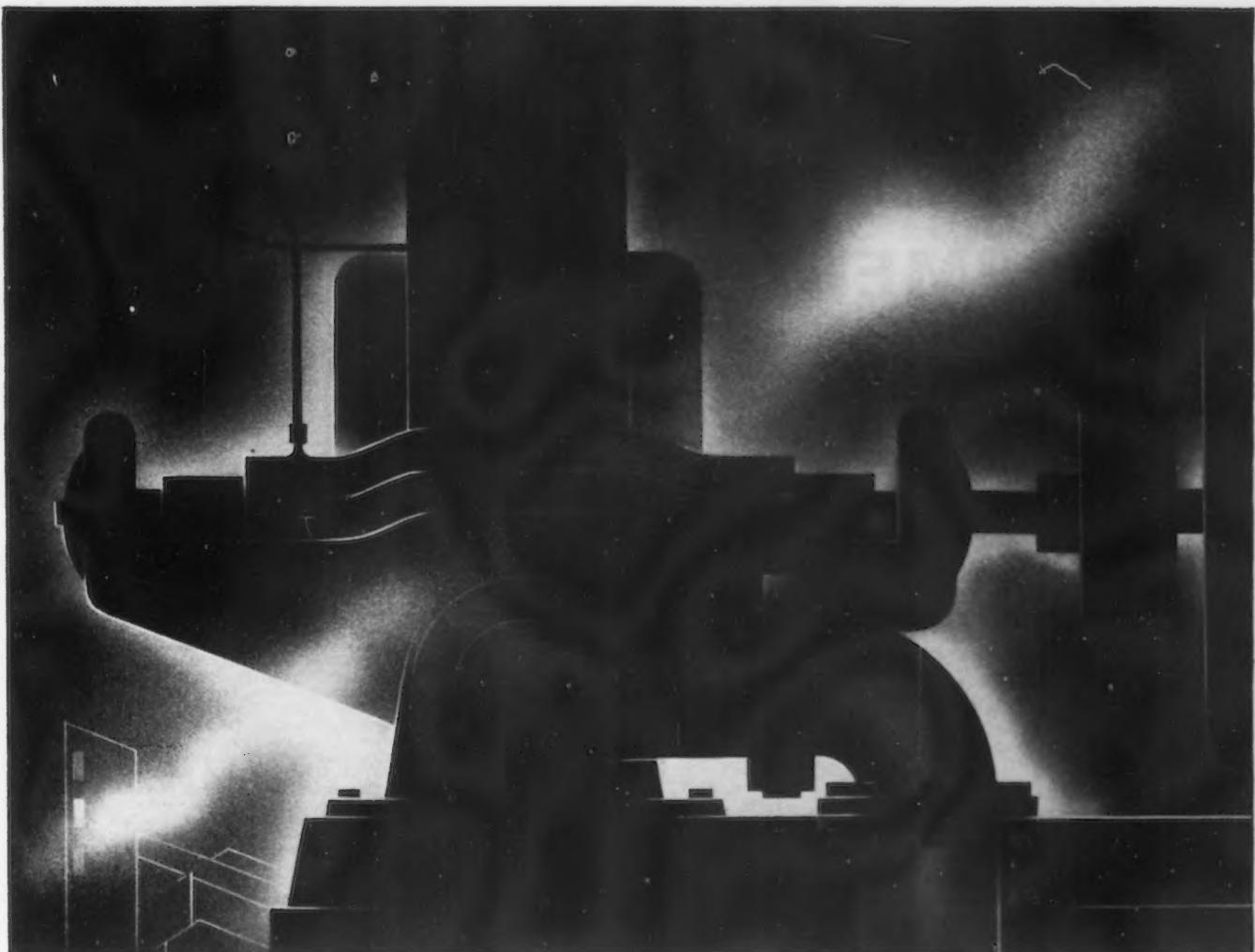
MACHINERY demand showed no substantial change the past week. A small improvement in domestic business was reported and this offset the slight recession in foreign ordering. Current business is without definite trend, but analysis of ordering indicates steady consumer interest in new tools. Manufacturers believe that a renewal of the upswing will arrive early in the first quarter. Lathes, milling machines and grinders continue to hold the leading position in current ordering, but other tools are not without demand. Business average is about 40 per cent of capacity, while operations are being held near the 60 per cent mark by backlog.

U. S. Steel Day Is Celebrated At Pittsburgh

PITTSBURGH this week held a United States Steel Day in connection with the decision by United States Steel Corp. to move operating control of many of its subsidiaries from New York to Pittsburgh.

Benjamin F. Fairless, appointed president of the corporation at 47, was honor guest Monday at a testimonial dinner held at the William Penn Hotel. The dinner was attended by hundreds of industrialists, bankers and other business men.

Whistles of industrial plants throughout the area were blown in tribute to the corporation as part of a program in which included a proclamation by Mayor Cornelius D. Scully of Pittsburgh.



Obvious—or Effective

WHEN machine parts failures become a problem, the obvious remedy is not always the most effective.

An important and alert manufacturer of centrifugal pumps, for instance, had impeller trouble. Steel impellers were the obvious answer, but cost was a factor to be considered.

A .75% Moly iron was used—and the trouble was eliminated. This hard, strong, fine-grained iron had

the necessary resistance to the abrasive action of the material handled by the pump. And—it held down the manufacturing cost.

Moly toughens cast iron, assures uniform structure throughout varying sections, and reduces porosity. It produces irons with high wear resistance and greater strength. It cuts production cost by eliminating many of the causes of rejects.

Our technical book, "Molybdenum," contains practical data on Moly irons and steels. It will be sent on request—as will our monthly news-sheet, "The Moly Matrix." Be free to consult our laboratory on special ferrous problems. Climax Molybdenum Company, 500 Fifth Avenue, New York City.

PRODUCERS OF FERRO-MOLYBDENUM, CALCIUM MOLYBDATE AND MOLYBDENUM TRIOXIDE

Climax Molybdenum Company



PLANT EXPANSION AND EQUIPMENT BUYING

◀ NORTH ATLANTIC ▶

Warren McArthur Corp., 1 Park Avenue, New York, manufacturer of aluminum and other metal furniture, with main plant at Rome, N. Y., has purchased former plant of Bantam Ball Bearing Co., Bantam, Conn., comprising one-story structure of about 40,000 sq. ft. floor space, and will remodel for new works.

Freeport Sulphur Co., 122 East Forty-second Street, New York, a subsidiary of Freeport Texas Co., same address, has authorized installation of additional equipment at mining properties at Freeport, Tex., including new mechanical conveyor and handling system for raw material. Cost close to \$65,000.

Signal Corps Procurement District, Army Base, Fifty-eighth Street and First Avenue, Brooklyn, asks bids until Jan. 5 for ventilating fans, sockets, relays, switches, coils, rectifier units, transformers and other equipment (Circular 87).

National Container Corp., Review and Borden Avenues, Long Island City, manufacturer of corrugated boxes and containers, has let general contract to Merritt-Chapman & Scott Corp., 17 Battery Place, for one-story building at new pulp and paper mill at Jacksonville, Fla., to be equipped as a recovery unit and for one-story structure adjoining to be used as a bark burner department. Cost close to \$80,000 with equipment. Same contractor is building main pulp and paper mill units to cost close to \$3,000,000 with machinery.

Board of Education, 500 Park Avenue, New York, has authorized plans for new three-story junior high school with manual training department at Bath Beach, to cost \$1,345,000; also for a similar junior high school at Union Hall Street and 149th Avenue, Jamaica, L. I., cost \$525,000, work to begin early in 1938. W. C. Martin, Flatbush Avenue Extension and Concord Street, Brooklyn, is architect.

Bush Terminal Co., 100 Broad Street, New York, has plans for extensions and improvements in five-story building at terminal, Forty-second Street and First Avenue, Brooklyn, for storage and distributing warehouse for liquors, totaling 200,000 sq. ft. floor space. Cost about \$125,000 with equipment. William Higginson & Son, 101 Park Avenue, New York, are architects.

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until Jan. 4 for 2500 lb. of brazing solder, 28,600 lb. tin-lead solder and 3300 lb. flux-lead solder for Brooklyn, Boston and other Eastern and Western Navy yards (Schedule 2315).

S.A.E. Motor Parts Co., 311 West Sixty-sixth Street, New York, automobile parts and equipment, has leased a four-story building at 145 West Sixty-third Street, for new parts and service plant.

S. B. Penick & Co., 132 Nassau Street, New York, manufacturer of industrial and other chemicals, has purchased former plant of United Cork Companies, Inc., at Lyndhurst, N. J., comprising 10-acre tract improved with six one and two-story factory units, four one-story warehouse buildings and power house, totaling about 75,000 sq. ft. of floor space. New owner will improve for new plant.

Metals Disintegrating Co., Morris Avenue, Townley, Elizabeth, N. J., has let general contract to Wilhelms Construction Co., 119 Division Street, Elizabeth, for two-story addition. Cost close to \$55,000 with equipment. Dudley & Anderson, 213 Edgar Place, are architects.

Alligator Rubber Products Co., 239 Ridgewood Avenue, Newark, N. J., general rubber specialties, has purchased adjoining land, totaling about 40,000 sq. ft., as site for one-story addition, for which superstructure will begin early next spring. Cost over \$50,000 with equipment.

United States Marine Corps, Navy Yard, Philadelphia, plans rebuilding one-story storage and distributing building at Mifflin Street and Delaware River, recently destroyed by fire. Loss about \$200,000 with equipment.

Commanding Officer, Ordnance Department, Philadelphia, asks bids until Dec. 28, for two oil-fired furnaces for breaking-up shop (Circular 534).

◀ BUFFALO DISTRICT ▶

Haberle Congress Brewing Co., Butter-nut Street, Syracuse, N. Y., has let general contract to Dawson Brothers Construction Co., Union Building, for remodeling former plant of Hathaway Baking Co., on neighboring site, recently acquired for a new mechanical-bottling works. Cost close to \$100,000, including new power house on adjoining site. King & King, Dennison Building, are architects.

Central School District, Fort Ann, N. Y., plans manual training department in new two-story central school, for which bids will be asked on general contract early in 1938. Bond issue of \$282,000 has been authorized. C. W. Clark, Main Street, Cortland, N. Y., is architect.

Jacob Dold Packing Co., 845 William Street, Buffalo, meat packer, has filed plans for extensions and improvements in plant. Cost about \$50,000 with equipment.

◀ NEW ENGLAND ▶

Sun Oil Co., Statler Building, Boston, has let general contract to Mauro Construction Co., 76 Westminster Street, Providence, R. I., for new bulk oil storage and distributing plant at Revere, Mass. Cost close to \$225,000 with steel tanks, pumping equipment, pipe lines and other facilities. Main offices are at Philadelphia.

Board of Contract and Supply, Metropolitan District, Municipal Building, 550 Main Street, Hartford, Conn., asks bids until Jan. 3 for gasoline engine-driven electric generator set and accessory equipment. Manager and chief engineer of water bureau, 1026 Main Street, is in charge.

International Harvester Co., 606 South Michigan Avenue, Chicago, motor truck division, has plans for one-story factory branch, storage and distributing plant, 100 x 200 ft., at Portland, Me. Cost over \$75,000 with equipment. Portland offices are at 540 Deering Avenue.

Cumberland County Power & Light Co., Portland, Me., is arranging for a new stock issue of about \$1,000,000, proceeds to be used in connection with a power development program now under way at Saco, Me., to include a hydroelectric generating station and transmission lines, with power substations and other structures.

Colonial Beacon Oil Co., 378 Stuart Street, Boston, has let general contract to H. V. Collins, 4 Westminster Street, Providence, R. I., for new bulk oil storage and distributing plant at South Portland, Me. Steel tanks will be installed for a capacity of 80,000 bbl. Cost about \$200,000 with equipment.

◀ SOUTH ATLANTIC ▶

B. L. Smith Corp., Miami, Fla., care of Major B. L. Smith, commander of marine contingent at Opa-Locka Naval Reserve Air Base, recently organized to manufacture airplanes and parts, has leased tract on Le Jeune Road, near municipal airport, for new plant. Initial unit will be one-story, for parts production and assembling. Cost over \$60,000 with equipment. Major Smith will be president.

Dixie Chemical Co., Inc., Kinston, N. C., manufacturer of commercial fertilizer, has plans for new one-story plant at New

Bern, N. C. Cost close to \$70,000 with equipment.

City School Board, Columbia, S. C., plans installation of manual training department in new two-story senior high school at Millwood Avenue and Devine Street, for which bids have been asked on general contract. Cost about \$225,000. James B. Urquhart, Central Union Building, is architect.

◀ WASHINGTON DIST. ▶
Chemical Warfare Service, Edgewood Arsenal, Edgewood, Md., asks bids until Dec. 30 for 44 mechanical blower units, with blower and motor mounted on cast iron base, complete with manually-operated rheostat and disconnect safety switch (Circular 171).

City Council, Hagerstown, Md., has rejected bids recently received for expansion and improvements in municipal electric power plant and will ask new bids soon. Installation will include new generating unit and auxiliary equipment. Cost about \$200,000. Wood & Kirkpatrick, Stock Exchange Building, Philadelphia, are consulting engineers.

General Purchasing Officer, Panama Canal, Washington, asks bids until Dec. 28 for two woodworking machines, one heavy scroll woodworking machine, three ball-bearing woodworking machines, one surfacer woodworking machine and one electric frequency changer (Schedule 3308); until Dec. 30, one metalworking machine, two metal-working lathes, one metal-working column shaper, one metal-working drilling machine, one metal-working machine and one electric-operated rivet heater (Schedule 3309). All machines to be motor driven.

Municipal Airport Bureau, Municipal Office Building, City Hall, Baltimore, has let general contract to Kauffman Construction Co., 1505 Race Street, Philadelphia, for superstructure for new airplane hangar with repair and reconditioning shop at municipal airport, Logan Field, Dundalk, Md. Cost over \$85,000 with equipment.

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until Jan. 4 for hand-operated fuel oil service pumps, special tools and wrenches (Schedule 2340) for Eastern yards and Puget Sound yard; nozzle blocks for turbines (Schedule 2339) for Eastern yards; one motor-driven floor-type sensitive drill press (Schedule 2320) for Mare Island yard; two motor-driven engine lathes and spare parts (Schedule 2327) for San Diego naval air station.

Purchasing and Contracting Officer, Holabird Quartermaster Depot, Baltimore, asks bids until Jan. 3 for one motor-generator set (Circular 388-55).

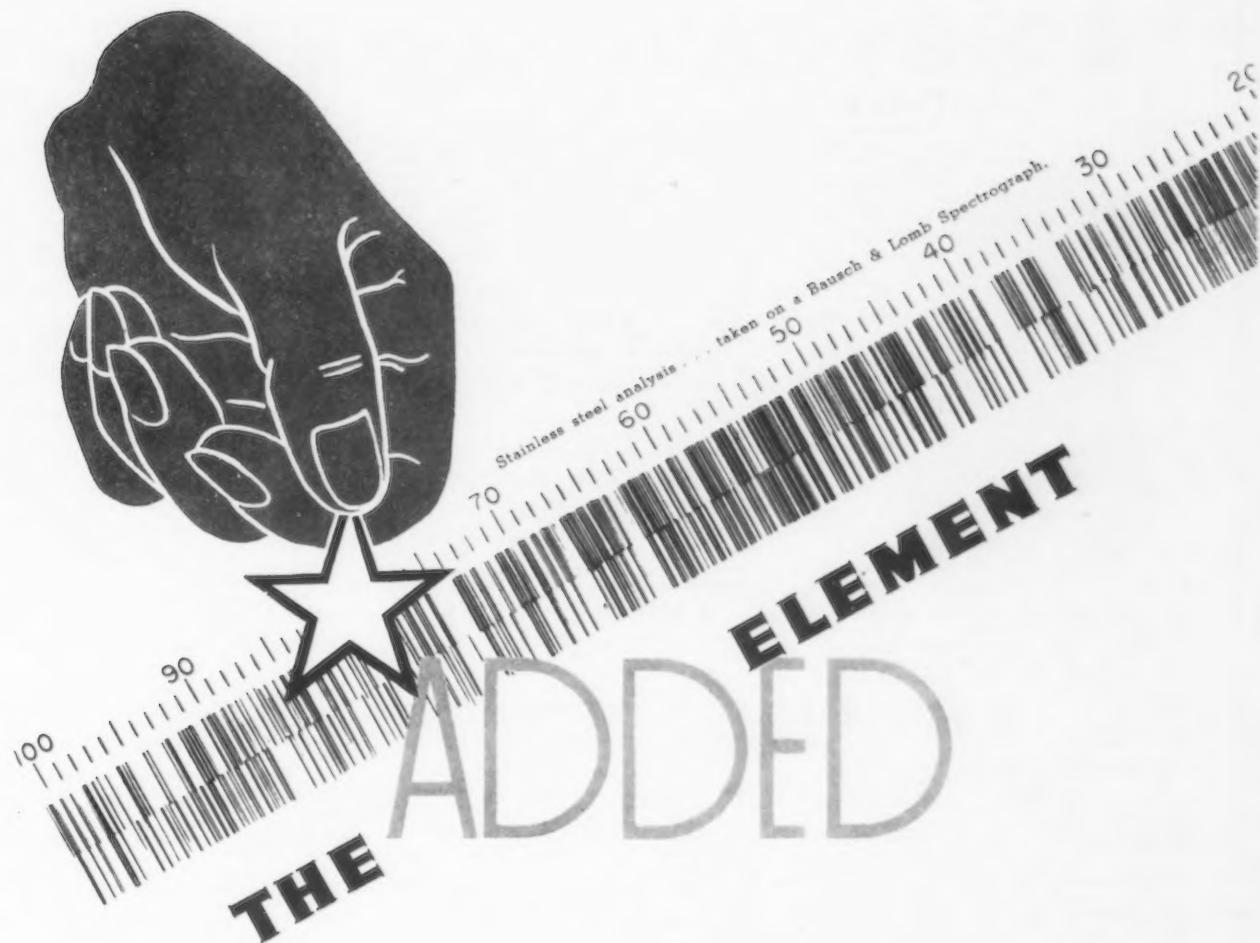
◀ SOUTHWEST ▶
Ford Motor Co., Dearborn, Mich., has acquired about 370-acre tract near outlet of Meramec River, near St. Louis, for new assembling plant, to include power house and other buildings. It will replace present assembling works of company in St. Louis downtown area. Cost over \$2,000,000 with equipment.

Board of Trustees, University of Missouri, Columbia, Mo., asks bids until Dec. 28 for one 750-kw. turbo-generator unit and auxiliaries, and one boiler with capacity of 50,000 lb. of steam per hr., with auxiliary equipment, for installation in power house. R. H. Sogard is superintendent.

Hull-Dillon Co., Pittsburg, Kan., meat packer, has plans for expansion and improvements. Cost over \$50,000 with equipment. Daniel R. Sandford, Wilhoit Building, Springfield, Mo., is architect.

Coca-Cola Bottling Co., 3540 Penn Avenue, Kansas City, Mo., has asked bids on general contract for one-story addition, 62 x 100 ft., to mechanical-bottling plant. Cost close to \$45,000 with equipment. S. J. Callahan, 7245 Jefferson Street, is architect and engineer.

Southland Paper Mills, Inc., Lufkin, Tex., care of Wirt Davis, chairman of board of directors, Republic National Bank, Dallas, Tex., organized several months ago to build a pulp and paper mill near Lufkin for production of newsprint, has arranged for loan of \$3,400,000 from RFC as part of fund required for plant. In addition, company has available \$1,600,000 from stock subscriptions and will increase this latter amount to \$3,600,000, making a total fund of \$7,000,000 for mill. It will consist of one and multi-story units, with power house, machine shop, pumping station and other mechanical departments. Mill will cost about \$5,000,000, remainder of fund noted to be used for development of pulpwood



★ In the Stainless Steel produced by Rustless there is an *added* element. It is not shown by spectrograph analysis, but by the revealing test of use. The presence of this element is recognized by every customer. It is *quality*.

This quality is present in all Rustless Bars and Wire because the organization, concentrating exclusively on making stainless steel, can concentrate on making it better. What this added element has done for others, it can do for you.

RUSTLESS IRON AND STEEL CORPORATION • BALTIMORE, MARYLAND



properties and working capital. E. L. Jurth, president, Angelina County Lumber Co., Lufkin, is an official of new company. Perkins-Goodwin Co., 30 Rockefeller Plaza, New York, paper products, is interested in project and will be active in operation and management.

◀ SOUTH CENTRAL ▶

Michael Despot, 545 Kingshighway, Shreveport, La., has acquired a four-story building at Culpeper and Van Loan Streets, and will remodel for new brewery, including brew-house equipment, mechanical-bottling and other machinery. Cost over \$150,000. Company will be organized to carry out project.

Common Council, Beattyville, Ky., has plans for new municipal electric light and power plant, using diesel engine-generator units and accessory equipment. Bond issue of \$90,000 has been approved.

M. L. Rogers, Brookhaven, Miss., has acquired tract in northern part of city, fronting on line of Illinois Central Railway, for one-story plant for manufacture of cotton and textile mill equipment. Cost close to \$40,000 with equipment.

Louisiana Steam Generating Corp., Baton Rouge, La., has awarded contract to Stone & Webster Engineering Corp., 49 Federal Street, Boston, for addition to steam-electric generating plant, for which superstructure will begin early in 1938. Cost close to \$3,000,000.

Fred I. Getty Mfg. Co., Jennings, La., manufacturer of oil well supplies and equipment, plans rebuilding part of plant recently destroyed by fire. Loss over \$100,000 with equipment.

Fayette County School Board, Lexington, Ky., plans manual training equipment in new two-story County high school at Picadome, Harrodsburg Pike, for which bids have been asked on general contract. Cost about \$130,000. John T. Gillig, Walton Building, is architect.

◀ WESTERN PA. DIST. ▶

Coca-Cola Bottling Co. of Pennsylvania, 1700 Jane Street, Pittsburgh, has asked bids on general contract for two-story and basement mechanical-bottling plant, 155 x 162 ft., at Negley Avenue and Center Street, including garage and service building for company motor trucks and cars. Cost close to \$140,000 with equipment. Robert & Co., Bona Allen Building, Atlanta, Ga., are architects and engineers.

LaBee, Inc., Huntington, W. Va., liquor distiller, has plans for expansion and improvements in plant at Guyandotte, near Huntington, with new distilling and rectifying equipment. Cost close to \$100,000 with machinery. H. W. Keyes is president.

Pennsylvania Township Board of Education, Harrison City, Pa., J. F. Long, president, plans manual training department in new two-story high school, for which bids will be asked soon on general contract. Cost about \$150,000. Financing is being arranged through Federal aid. C. H. Sorber, First National Bank Building, Greensburg, Pa., is architect.

◀ MICHIGAN DISTRICT ▶

Keysey-Hayes Wheel Co., 3600 Military Avenue, Detroit, steel automobile wheels and other automotive products, has asked bids on revised plans for new plant on 30-acre tract on Neville Island, Pittsburgh, recently acquired. Initial units will comprise main one-story structure, 400 x 440 ft., and several smaller buildings. Cost close to \$1,000,000 with equipment. Albert Kahn, Inc., New Center Building, Detroit, is architect and engineer.

Eddy Paper Corp., Three Rivers, Mich., manufacturer of container board, chip board and other heavy paper stocks, has let general contract to F. Shoemaker Co., Sturgis, Mich., for new power house at branch mill at White Pigeon, Mich. Cost close to \$50,000 with boilers and other equipment. Company also has let general contract to Austin Co., Detroit, for one-story addition to factory branch at 590 Lycaste Avenue, Detroit, for storage and distribution. Cost about \$45,000 with equipment.

Garden City Fan Co., Niles, Mich., manufacturer of mechanical draft equipment, etc., plans one-story addition. Cost close to \$45,000 with equipment. Main offices are at Chicago.

◀ OHIO AND INDIANA ▶

National Supply Co., 3320 Bishop Street, Toledo, Ohio, manufacturer of oil well equipment and supplies, has let general contract to A. Bentley & Sons Co., 201 Belmont Street, for one-story addition to

foundry and improvements in present unit. Cost close to \$40,000 with equipment.

Toledo Edison Co., Edison Building, Toledo, Ohio, has arranged fund of about \$1,900,000 for expansion and improvements in power plants and system, including extensions in transmission and distributing lines, power substations, switching stations and other structures.

Joslin-Schmidt Corp., Big Four Railroad and Smalley Road, Lockland, Cincinnati, meat packer, has plans for expansion and improvements in power plant, including additional equipment. Cost close to \$40,000 with equipment. Fosdick & Hilmer, Union Trust Building, Cincinnati, are consulting engineers.

Franklin Brewery Co., North Sandusky Street, Columbus, Ohio, has authorized plans for one-story mechanical-bottling works. Cost over \$50,000 with equipment. Bids will be asked on general contract in 60 to 90 days. Charles Cloud, 203 East Broad Street, is architect.

H. G. Hartzner Wrecking & Excavating Co., Dayton, Ohio, plans rebuilding part of equipment storage and service plant recently destroyed by fire. Loss over \$75,000 with equipment.

Board of School Trustees, Decatur, Ind., plans manual training shops in new two-story and basement high school, for which bids will be asked soon on general contract. Cost about \$245,000. A. M. Strauss, Cal-Wayne Building, Fort Wayne, Ind., is architect; Bevington-Williams, Inc., Indiana Pythian Building, Indianapolis, is consulting engineer.

◀ MIDDLE WEST ▶

Illinois Zinc Co., 332 South Michigan Avenue, Chicago, plans new works for production of special zinc alloys, consisting of a main one-story unit for strip rolling mill and several auxiliary structures. It is proposed to have plant completed late in spring. Cost over \$400,000 with machinery.

C. R. Jahn Co., 228 North LaSalle Street, Chicago, manufacturer of heavy-duty trailers and parts, has leased one-story building at 1351 West Thirty-seventh Place, for expansion.

Bureau of Reclamation, Denver, asks bids until Jan. 3 for three motor-driven gate hoists for operating 14 x 50 ft. fixed wheel gates in spillway at Seminole dam, Kendrick project, Kendrick, Wyo. (Specifications 763).

City Council, Morning Sun, Iowa, asks bids until Jan. 3 for three 360-hp. diesel engine-generator units, oil tanks and auxiliary equipment for municipal electric power plant. R. H. Gerhart, 349 Twenty-first Street, S.E., Cedar Rapids, Iowa, is consulting engineer.

City Council, Detroit Lakes, Minn., asks bids until Jan. 3 for coal-handling machinery and other equipment for municipal electric power station. Yoster & Wahlberg, Duluth, Minn., are consulting engineers.

Nebraska Consolidated Mills Co., 1521 North Sixteenth Street, Omaha, Neb., has asked bids on general contract for expansion and improvements in flour mill, including four-story addition, 42 x 50 ft., for storage and distribution; one-story top addition to present building, 32 x 50 ft.; extensions in storage bin division; new loading dock, 42 x 44 ft., and service and garage building for company motor trucks. Cost over \$150,000 with equipment. Horner & Wyatt, Board of Trade Building, Kansas City, Mo., are consulting engineers.

Wisconsin Public Service Corp., 1029 North Marshall Street, Milwaukee, has plans for new hydroelectric generating plant on Wisconsin River, near Tomahawk, Wis., to cost about \$1,500,000. Project is under direction of its chief engineer, A. G. Carson, Bellin Building, Green Bay, Wis.

J. I. Case Co., Racine, Wis., has placed general contract with Nelson Co., local, for first unit, 129 x 256 ft., of new heat treating shop at tractor works in Racine. Contracts also are being placed for new warehouse and crane way, 150 x 1100 ft., for branch at Burlington, Iowa. Frank J. Hoffman, 503 Janes Building, Racine, Wis., is architect.

Marco Mfg. Co., Chicago, manufacturer of automotive ignition replacement parts and other specialties, has completed transfer of plant and headquarters to Fond du Lac, Wis., where capacity will be more than doubled.

Polk County Board, Balsam Lake, Wis., has authorized appropriation of \$97,000 for new highway department headquarters, 80 x 300 ft., part two stories and basement, including machine shop, power plant, office, etc. Architect is E. F. Klingler, Amery, Wis. V. A. Hansen is County Clerk.

Master Lock Co., 926 West Juneau Avenue, Milwaukee, manufacturer of laminated steel locks, is remodeling six shop units at 2640 North Thirty-second Street, and building additional unit, 40 x 41 ft., improvements to cost about \$35,000. A. L. Seidenschwartz is architect.

O. A. Hillary, Beloit, Wis., and formerly of Rockford, Ill., has reopened Beloit Brass Works in South Beloit under name of Superior Brass & Foundry, to do general jobbing business in brass, bronze and alloys. Some modernization is under way.

Burd Piston Ring Co., Rockford, Ill., has acquired a local four-story factory building containing 150,000 sq. ft. of floor space for manufacture of HaDees car heaters, which will double capacity of Liberty Foundries Co. division. Included in purchase is a 5 1/2-acre tract for further expansion.

◀ PACIFIC COAST ▶

Board of Education, 1151 South Broadway, Los Angeles, will take bids soon on general contract for one-story addition, 65 x 208 ft., to manual arts high school at 4131 South Vermont Avenue. An appropriation of \$136,000 has been made for building and equipment. John and Donald B. Parkinson, Title Insurance Building, are architects.

Owens-Illinois Pacific Coast Co., 1855 Folsom Street, San Francisco, a unit of Owens-Illinois Glass Co., Toledo, Ohio, has asked bids on general contract for one and two-story plant at Fruitvale Avenue and Estuary, Oakland, Cal., in part for storage and distribution. Cost close to \$300,000 with equipment. J. H. Brunnier, Sharon Building, San Francisco, is consulting engineer.

Bureau of Reclamation, Denver, asks bids until Dec. 27 for two motor-driven pumping units for Tule Lake No. 6 drainage pumping plant, Klamath Falls, Ore., including accessory equipment (Specifications 999-D).

Columbia Breweries, Inc., 2120 South C Street, Tacoma, Wash., has let general contract to J. W. Bailey Construction Co., Insurance Building, for three-story addition for storage and distribution. Cost about \$80,000 with equipment.

Department of Water and Power, 207 South Broadway, Los Angeles, has filed plans for one-story repair shop, 35 x 65 ft., at 5740 Whitnall Highway, Van Nuys district, and will begin superstructure soon.

W. P. Fuller & Co., 135 North La Angeles Street, Los Angeles, manufacturers of paints, varnishes, oils, etc., have let general contract to Myers Brothers, 3407 San Fernando Road, for one-story building, 73 x 120 ft., at 2201 Barranca Street, for storage and distribution. Cost close to \$50,000 with equipment. Gordon B. Kauffman, 627 South Carondelet Street, is architect.

International Harvester Co., 606 South Michigan Avenue, Chicago, will ask bids soon on general contract for one and two-story factory branch, storage and distributing plant, 250 x 320 ft., at Spokane, Wash., fronting on line of Northern Pacific Railway. Unit will total about 100,000 sq. ft. floor space. Cost over \$200,000 with equipment.

◀ FOREIGN ▶

Crosse & Blackwell, Ltd., Glasgow, Scotland, canned and bottled food products, has plans for new processing and canning plant at Peterhead, Scotland, with power house, machine shop and other structures. Cost over \$400,000 with equipment.

Imperial Chemical Industries, Ltd., 7 Millbank Street, S.W., London, England, has plans for new works at Mossend, England, for production of ammonia and kindred specialties. Cost about \$900,000 with machinery.

Hiram Walker & Co., Ltd., Dumbarton, Scotland, has authorized plans for second unit of new distillery, comprising several one and multi-story buildings, for which superstructure will begin early in 1938. Cost close to \$700,000 with machinery. Company is affiliated with Hiram Walker & Sons, Ltd., Montreal.

Venezuelan Oil Concessions, Ltd., Maracaibo, Venezuela, a subsidiary of Royal Dutch-Shell, Ltd., London, England, has engaged J. G. White Engineering Corp., 80 Broad Street, New York, to design and erect a new steam-operated electric generating plant at oil properties at Lake Maracaibo, installation to include four 5000-kw. turbo-generator units, four 1000-hp. boilers, pumping machinery and auxiliary equipment. Majority of equipment will be purchased by engineering company in United States. Cost over \$750,000 with power lines and operating equipment at oil wells.

CROSBY for STAMPINGS

Serving Industry Since 1896



ALL our efforts have been concentrated on one product — STAMPINGS — for 40 years. We have made stampings, deep, intricate, heavy, light, large and small, for nearly every branch of industry.



Get Acquainted With Crosby Service

THE CROSBY COMPANY

General Offices and Works: BUFFALO, NEW YORK

Branch Offices: Chicago Detroit Cleveland New York Philadelphia



THE ATHENIA STEEL CO.

Clifton Ave., Clifton, N. J.

Works, Athenia, N. J.

Makers of High Grade Tempered and Polished Steel for Clock, Watch, Motor and Typewriter Springs. Also Wound Springs. Tempered and Untempered Steel for other purposes. Special quality equal to finest imported for finish and accurate rolling. Also Stainless Steels of various grades.

AGENTS:—

Lapham Hickey Co.—8333 W. 47th Place, Chicago, Ill.—414 United Artists Bldg., Detroit, Mich.
E. F. Krause & Co.—430-440 Commercial St., Los Angeles, Calif.
Hill Chase & Co.—Richmond and Ontario Sts., Philadelphia, Pa.
Wetherell Bros. Co.—251 Albany St., Cambridge, Mass.

HOLCROFT & COMPANY

LEADERS IN BUILDING AND DESIGNING ELECTRIC AND COMBUSTION FURNACES, KILNS AND OVENS. HOME OFFICE: DETROIT—BRANCHES: CHICAGO, PHILADELPHIA. CANADA: WALKER METAL PRODUCTS, LTD., WALKERVILLE, ONT.

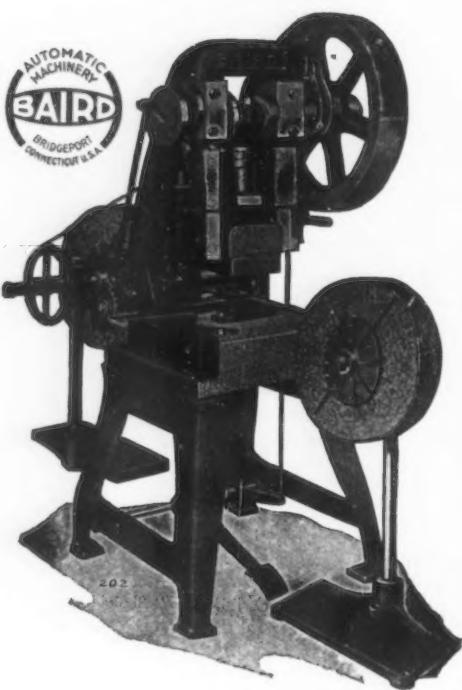
One of The Iron Age's oil company subscribers recently defined the usefulness of The Iron Age as follows:

"The ten individuals reading The Iron Age are superintendents and foremen of the Stores Dept. which includes Tools, Trucking, and Salvage--also of the Mechanical Dept. and Package Division, so you can see that your magazine is interesting.

It contains information on all sorts of Mechanical equipment, welding, articles on steels, tools, and equipment used in transporting materials around the plant.

"This seems to be one of the best magazines for use of the ten individuals shown on this list."

Combines Automatic Operation with Short Set-Up Time



It is not so difficult to design a machine for specialized high production on a single kind of work where set-up time and cost do not have to be considered.

In the BAIRD Automatic Press we have built a high production machine that is moderate in price and the set-up time in changing over from one attachment to another is surprisingly short.

Thus you can get rapid production and automatic operation on a wide variety of press jobs that will help you to meet competition. Let us show you what this automatic press would do on your work.

"Ask BAIRD About It"

**THE BAIRD MACHINE CO.
BRIDGEPORT, CONNECTICUT**

Throughout the manufacturing plants in the metal-working industry as well as in the basic mills that produce steel and non-ferrous metals *The Iron Age* is the most widely read industrial publication.

It is read by production, engineering, administrative and purchasing executives. Some of them turn first to the editorials, others to *Washington News*, *Assembly Line*, *Power Transmission* articles, *Materials Handling* articles, *Price information*, *News*, and *Technical* articles.

There's something of interest for all of them.

Products Index

ABRASIVE WHEELS — See Grinding Wheels

ABRASIVE CLOTH & PAPER

Norton Co., Worcester, Mass.

ABRASIVES — Steel Shot and Grit

Pangborn Corporation, Hagerstown, Md.

ACCESSORIES — Welding

Lincoln Electric Co., The, Cleveland.

ACCUMULATORS — Hydraulic

Accumul-Southwark Corp., Southwark Div., Philadelphia.

Hydraulik GmbH, Duisburg, Germany.

Lake Erie Engineering Corp., 68 Kenmore Sta., Buffalo, N. Y.

Wood, R. D., & Co., Philadelphia.

ACETYLENE — Dissolved in Cylinders & Small Tanks

Air Reduction Sales Co., 60 East 42nd St., N. Y. C.

Linde Air Products Company, The, 30 East 42nd St., N. Y. C.

ACID-PROOF CEMENT

Havex Corporation, Newark, Delaware.

Pennsylvania Salt Mfg. Co., Philadelphia, Pa.

ACID-PROOF CONSTRUCTION

Atlas Mineral Prods. Co. of Pa., The, Meritown, Pa.

ACIDS — Pickling

American Chemical Paint Co., Ambler, Pa.

Du Pont de Nemours, E. I., & Co., Inc., Grasselli Chemicals Dept., Wilmington, Del.

Pennsylvania Salt Mfg. Co., Philadelphia, Pa.

AIR CONDITIONING EQUIPMENT

American Blower Corp., 6000 Russell St., Detroit.

AMMETERS AND VOLTMETERS

Weston Electrical Instrument Corp., New York, N. J.

AIR TANKS AND CYLINDERS

Seafle, William B., & Sons Co., Pgh.

ALLOYS — Copper

American Brass Co., The, Waterbury, Conn.

ALLOYS — Ferro

Electro Metallurgical Sales Corp., 30 East 42nd St., N. Y. C.

ALLOYS — Magnesium

Dow Chemical Co., The, 921 Jefferson Ave., Midland, Mich.

ALLOYS — Phosphor Bronze

Phosphor Bronze Smelting Co., The, Phila.

ALLOYS — Resistance Welding

Electroly Co., Inc., 50 Church St., New York City.

ALLOYS — Titanium

Titanium Alloy Mfg. Co., The, Niagara Falls, N. Y.

ALLOYS — Tungsten

Vanadium Corp. of America, 420 Lexington Ave., N. Y. C.

ALLOYS — Vanadium

Vanadium Corp. of America, 420 Lexington Ave., N. Y. C.

ALLOYS — Zinc Base Die Casting

New Jersey Zinc Co., The, 160 Front St., N. Y. C.

ALUMINUM

Aluminum Co. of America, Pittsburgh, Seligman, Arthur, & Co., Inc., 30 Rockefeller Plaza, R. C. A. Bldg., N. Y. C.

AMMETERS AND VOLTMETERS — Recording

Leeds & Northrup Co., Philadelphia.

AMMONIA RECOVERY PLANTS

Koppers Co., Pittsburgh.

ANGLES, BEAMS, CHANNELS AND TEES

Carnegie-Illinois Steel Corp. (U. S. Steel Corp. Subsidiary), Pittsburgh & Chicago.

Columbia Steel Co. (U. S. Steel Corp. Subsidiary), San Francisco, Calif.

Inset Steel Co., Chicago.

Jones & Laughlin Steel Corp., Pittsburgh.

Ryerson, Jones, & Sons, Inc., Chicago.

Scully Steel Products Co. (U. S. Steel Corp. Subsidiary), Chicago.

Steel & Tubes, Inc., Cleveland.

Tennessee Coal, Iron & Railroad Co. (U. S. Steel Corp. Subsidiary), Birmingham, Ala.

Welton (W. Va.) Steel Co.

ANGLES, BEAMS, CHANNELS & TEES — Magnesium Alloys

Dow Chemical Co., The, 921 Jefferson Ave., Midland, Mich.

ANNEALING — See Heat Treating

ANNEALING BOXES

Lebanon (Pa.) Steel Foundry.

United Engineering & Fdry. Co., Pgh.

ANNEALING COVERS

Surface Combustion Corp., 2375 Dorr St., Toledo.

W. H. Lee Engineering Co., The, Cleveland.

ANODES — All Types

Du Pont de Nemours, E. I., & Co., Inc., Grasselli Chemicals Dept., Wilmington, Del.

Seymour (Conn.) Mfg. Co.

Udylite Co., The, Detroit.

ANODES — Cadmium

Du Pont de Nemours, E. I., & Co., Inc., Grasselli Chemicals Dept., Wilmington, Del.

Udylite Co., The, Detroit.

ANODES — Lead

National Lead Co., 111 Bdway., N. Y. C.

APPAREL — Welding

Lincoln Electric Co., The, Cleveland.

ARBORS

Cincinnati (Ohio) Milling Mch. Co., The, Morse Twist Drill & Mch. Co., New Bedford, Mass.

ARMORING MACHINERY — Cable, Wire, Hose

Sleeper & Hartley, Inc., Worcester, Mass.

ARRESTERS — Spark

Harrington & King Perforating Co., Chicago.

AXLES — Car or Locomotive

Carnegie-Illinois Steel Corp. (U. S. Steel Corp. Subsidiary), Pittsburgh & Chicago.

BABBITT METALS

Cudman, A. W., Mfg. Co., Pittsburgh, Pa., National Lead Co., 111 Bdway., N. Y. C.

BALANCING MACHINES — Static Dynamic

Gisholt Machine Co., Madison, Wis., Olsen, Tinian Testing Machine Co., Philadelphia.

BALING PRESSES — Scrap — See Presses — Baling

BALLS — Burnishing

Abbott Ball Co., The, 1047 New Britain Ave., Hartford, Conn. Steel Ball Co., The, Hartford (Conn.) Steel Ball Co., The, New Departure Div., General Motors Corp., Bristol, Conn.

BANDS — Steel

Acme Steel Co., Chicago. Tennessee Coal, Iron & Railroad Co. (U. S. Steel Corp. Subsidiary), Birmingham, Ala.

BANDS — Welded

Amer. Welding & Mfg. Co., Warren, O.

BARRELS — Burnishing

Abbott Ball Co., The, 1047 New Britain Ave., Hartford, Conn. Hanshoff, N. Inc., Cincinnati.

BARRELS — Tumbling

Baird Mch. Co., The, Bridgeport, Conn. Hartford (Conn.) Steel Ball Co., The, Hanshoff, N. Inc., Cincinnati.

BARRELS — Alloy

Republic Steel Corp., Cleveland, Ohio.

BARS — Aluminum

Aluminum Co. of America, Pittsburgh.

BARS — Brass, Bronze or Copper

Bunting Brass & Bronze Co., Toledo, Ohio. Johnson Bronze Co., 505 So. Mill St., New Castle, Pa.

BARS — Cold Drawn

American Steel & Wire Co. (U. S. Steel Corp. Subsidiary), Chicago.

Bliss & Laughlin, Inc., Harvey, Ill.

Union Drawn Steel Co., Massillon, Ohio.

BARS — Concrete, Reinforcing

Carnegie-Illinois Steel Corp. (U. S. Steel Corp. Subsidiary), Pittsburgh & Chicago.

Columbia Steel Co. (U. S. Steel Corp. Subsidiary), San Francisco, Calif.

Jones & Laughlin Steel Corp., Pittsburgh.

Laclede Steel Co., St. Louis, Mo.

Tennessee Coal, Iron & Railroad Co. (U. S. Steel Corp. Subsidiary), Birmingham, Ala.

BARS — Magnesium Alloys

Dow Chemical Co., The, 921 Jefferson Ave., Midland, Mich.

BARS — Rustless

Rustless Iron & Steel Corp., Baltimore, Md.

BARS — Steel

Bethlehem (Pa.) Steel Company. Carnegie-Illinois Steel Corp. (U. S. Steel Corp. Subsidiary), Pittsburgh & Chicago.

Great Lakes Steel Corp., Detroit.

Inland Steel Co., Chicago.

Jones & Laughlin Steel Corp., Pittsburgh.

Republic Steel Corp., Cleveland, Ohio.

Ryerson, Jones, & Sons, Inc., Chicago.

Scully Steel Products Co. (U. S. Steel Corp. Subsidiary), Chicago.

Steel & Tubes, Inc., Cleveland.

Tennessee Coal, Iron & Railroad Co. (U. S. Steel Corp. Subsidiary), Birmingham, Ala.

BATTERIES — Storage

Electric Storage Battery Co., The, Phila. USL Battery Corp., Niagara Falls, N. Y.

BATTERY CHARGERS

Cutter-Hammer, Inc., Milwaukee.

BEAMS — See Angles, Beams, Channels and Tees

BEARINGS — Babbitt

Cudman, A. W., Mfg. Co., Pittsburgh, Pa., Johnson Bronze Co., 505 So. Mill St., New Castle, Pa.

BEARINGS — Ball

Bantam Bearings Corp., The, South Bend, Indiana.

BEARINGS — Federal

Federal Bearings Co., Inc., The, Poughkeepsie, N. Y.

Conomatics and Cone Automatics

Are economical and accurate producers of screw machine parts up to 6" diameter, 7" milling length. They cut costs, increase production, boost profits.

Write for particulars

CONE AUTOMATIC MACHINE CO., Inc.

WINDSOR, VERMONT

REPRESENTATIVES:

Detroit: J. C. Austerberry's Sons, 332 Curtis Bldg., Detroit, Mich.

Chicago: John H. Glover, 2127 North State Ave., Chicago, Ill.

New England: Potter & Johnston Machine Co., Pawtucket, R. I.

Indiana: G. A. Richey, Chamber of Commerce Bldg., Indianapolis, Ind.

New York State: Syracuse Supply Co., Syracuse, N. Y.; also Buffalo, N. Y.

LELAND-GIFFORD COMPANY

Worcester, Mass.

Drilling Machinery

Belt and Motor Spindle

One to Six Spindles

Tapping Attachments and Multiple Heads

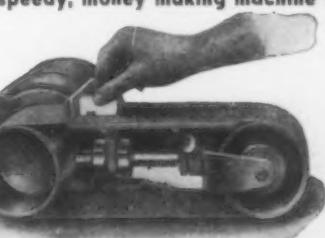
LUCAS "PRECISION"

Horizontal Boring, Drilling and Milling Machine

THE LUCAS MACHINE TOOL CO.

NOW AND
ALWAYS OF

CLEVELAND,
OHIO, U.S.A.



No. 601 Abrasive Belt Polisher-Surfacer

a speedy, money making machine for small part finishing

Its hardness is exceeded only by its fast performance and economical operation. Finishes castings, removes burrs, straightens dies, stampings, etc., quickly and at low cost. Gives straight line finish and leaves sharp edges. Fired low . . . sturdily built . . . eliminates hand labor . . . reduces labor costs. Other belt surfaces 4 to 20" wide. Send for illustrated descriptive bulletin.

PRODUCTION MACHINE CO.

GRINDING, POLISHING, FINISHING MACHINERY

GREENFIELD, MASS.

FRICTION FEARS THIS FOE
Rely on Abbott for steel balls in precision and commercial tolerances.

THE ABBOTT BALL COMPANY

1047 New Britain Ave., Hartford, Conn.

ABBOTT BEARING BALLS

"METALINE"

(REGISTERED TRADE MARK)

OILLESS BRONZE BEARINGS

R. W. RHOADES METALINE CO., INC.

LONG ISLAND CITY, N. Y.

43-3RD ST.

JUST BETWEEN US TWO

P.O. Sees Red

DESPITE the fact that the envelopes in which The Iron Age is mailed are printed in red, the Moscow post office is not satisfied and complains that copies are occasionally received in envelopes so tattered that they look like a molecular space lattice diagram.

The envelope we use is made of a reasonably heavy and tough kraft paper—28 lb. So tenderly does Mr. Farley's department handle The Iron Age that complaints from domestic subscribers are rare. In fact, Bill Sherman, our Detroit editor and writer of the forthright "On the Assembly Line," finds the secretary of a subscriber he calls upon uses the envelopes to store the different colored scraps of silk of which she is making a crazy quilt.

Even if your secretary is not making a crazy quilt, we would be mildly interested in hearing from you if the condition of your copies upon arrival is not pristine.

Oilman Gets Profane

IN deference to Miss Romaine of the Schnitzer Alloy Products Co., Elizabeth, N. J., and others, communications containing profanity are rigidly excluded from this column. We refer to such letters as this, from a big shot in a well-known oil company:

"I consider the editorials of J. H. Van Deventer are very nearly worth the price of the subscription. As the automobile is one of the primary mediums of consumption of the products we manufacture, we find "On the Assembly Line" of considerable interest. It is my personal opinion that The Iron Age, taken all in all, is a damn fine publication."

Heckler

THEN, representing the minority opinion, we have Chicago's angry man, who hurls at our innocent head a weekly letter rending the economic status quo. Latest sample:

"Say, remind J. H. Van Deventer about 1929, will you? You remember—when Big Business had everything its own way—and ask him what happened! Ask him after Congress did everything he asked and got capital goods industry running full blast (at lower wages, higher profits, etc.), who'd have the money to buy the flood of new goods?"

Don't look at us that way, S.W. We just happened to be passing by.

Stopper

IT floats through the hose with the greatest of ease—Goodrich.

St. George Takes Day Off

TO guard your health and pocket book, the Federal Trade Commission casts a jaundiced eye periodically on advertising claims—even on those in your sainted family journal. Only this week a letter came in from the Commission, asking for three copies of the latest issue "for official review."

The price of single copies of The Iron Age is 25¢. We have a feeling that we are being regimented. Maybe we should stand up for our rights. On the other hand, if we antagonize the Commission, it might make itself as much of a nuisance as the Oberleutnant, by saying "prove it" every time we claim "best," "greatest," and so on.

Besides, the letter says "please," and contains a frank for free mailing, so we will content ourselves by muttering something under our breath.

To Cut the Cost of Alphabet Soup

THAT idea of ours about making noodles in different shaped cross sections so that they can be used for structural models aroused so little opposition that we are moved to do something for the manufacturers of the little letters used in alphabet soup.

They seem to be stamped out of sheet dough, which involves considerable waste. So why not extrude them in lengths, slicing the letters off in thin widths? They could be made in different type faces—Stellar Light Face for those with delicate stomachs, and Kabel Extra Bold for those whose gastric juices never fail to make a first down.

Advertising men and editors could use them in planning layouts. Advertising club restaurants could advertise, "Today's special—10 point Bodoni italic alphabet soup." The possibilities are endless.

Merry Christmas

—A.H.D.

Products Index

New Departure Div., General Motors Corp., Bristol, Conn.
Norma-Hoffmann Bearings Corp., Stamford, Conn.
SKF Industries, Inc., Front St. & Erie Ave., Phila., Pa.
Schatz Mfg. Co., Poughkeepsie, N. Y.

BEARINGS, Brass and Bronze
Ampco Metal, Inc., Milwaukee, Wis.
Bunting Brass & Bronze Co., Toledo, O.
Johnson Bronze Co., 505 So. Mill St., New Castle, Pa.
Lawrenceville Bronze Co., Pittsburgh.
National Bearing Metals Corp., Pittsburgh.

BEARINGS—Oilless
Bunting Brass & Bronze Co., Toledo, O.
Rhoads, R. W., Metaline Co., Inc., Long Island City, N. Y.
Richardson Co., The, Melrose Park, Ill.

BEARINGS—Quill
Bantam Bearings Corp., The, South Bend, Ind., Indiana.

BEARINGS—Radial
Bantam Bearings Corp., The, South Bend, Ind., Indiana.

Federal Bearings Co., Inc., The, Poughkeepsie, N. Y.
Hyatt Bearings Div., General Motors Corp., Newark, N. J.

New Departure Div., General Motors Corp., Bristol, Conn.
Norma-Hoffmann Bearings Corp., Stamford, Conn.

SKF Industries, Inc., Front St. & Erie Ave., Phila., Pa.
Schatz Mfg. Co., The, Poughkeepsie, N. Y.
Shafer Bearing Corp., 35 East Wacker Drive, Chicago.

BEARINGS—Roll Neck
Bantam Bearings Corp., The, South Bend, Indiana.

Morgan Construction Co., Worcester, Mass.
SKF Industries, Inc., Front St. & Erie Ave., Phila., Pa.

Shafer Bearing Corp., 35 East Wacker Drive, Chicago.
Timken Roller Bearing Co., The, Canton, O.

BEARINGS—Roller
Bantam Bearings Corp., The, South Bend, Indiana.

Hyatt Bearings Div., General Motors Corp., Newark, N. J.
Norma-Hoffmann Bearings Corp., Stamford, Conn.

SKF Industries, Inc., Front St. & Erie Ave., Phila., Pa.
Shafer Bearing Corp., 35 East Wacker Drive, Chicago.

Standard Machinery Co., Providence, R. I.
Timken Roller Bearing Co., The, Canton, O.

BEARINGS—Roller Tapered
Bantam Bearings Corp., The, South Bend, Indiana.

Timken Roller Bearing Co., The, Canton, O.

BEARINGS—Rolling Mill Equipment
Bantam Bearings Corp., The, South Bend, Indiana.

Richardson Co., The, Melrose Park, Ill.

SKF Industries, Inc., Front St. & Erie Ave., Phila., Pa.
Timken Roller Bearing Co., The, Canton, O.

BEARINGS—Self-aligning Roller
Shafer Bearing Corp., 35 East Wacker Drive, Chicago.

BEARINGS—Shaft Hanger

Hyatt Bearings Div., General Motors Corp., Newark, N. J.

Norma-Hoffmann Bearings Corp., Stamford, Conn.

SKF Industries, Inc., Front St. & Erie Ave., Phila., Pa.
Shafer Bearing Corp., 35 East Wacker Drive, Chicago.

BEARINGS—Thrust

Bantam Bearings Corp., The, South Bend, Indiana.

Federal Bearings Co., Inc., The, Poughkeepsie, N. Y.

Hyatt Bearings Div., General Motors Corp., Newark, N. J.

New Departure Div., General Motors Corp., Bristol, Conn.

Norma-Hoffmann Bearings Corp., Stamford, Conn.

SKF Industries, Inc., Front St. & Erie Ave., Phila., Pa.

Shafer Bearing Corp., 35 East Wacker Drive, Chicago.

Timken Roller Bearing Co., The, Canton, O.

BELT DRESSING

Rhoads, J. E. & Sons, Philadelphia.

BELT LACING

Rhoads, J. E. & Sons, Philadelphia.

BELT—Conveyor, Elevator

Goodrich, B. F., Co., The, Akron, Ohio.

Goodrich, B. F., Co., The, Akron, Ohio.

Manhattan Rubber Mfg. Div. of Raybestos-Manhattan, Inc., The, 2 Townsend St., Passaic, N. J.

BELTING—Rubber

Goodrich, B. F., Co., The, Akron, Ohio.

Goodyear Tire & Rubber Co., Akron, Ohio.

Manhattan Rubber Mfg. Div. of Raybestos-Manhattan, Inc., The, 2 Townsend St., Passaic, N. J.

Robins Conveying Belt Co., 15 Park Row, N. Y. C.

BELTS—V-Type

Allis-Chalmers Mfg. Co., Milwaukee.

Goodyear Tire & Rubber Co., Akron, Ohio.

Manhattan Rubber Mfg. Div. of Raybestos-Manhattan, Inc., The, 2 Townsend St., Passaic, N. J.

BENDING MACHINES—Hand, Band and Angle

Excelsior Tool & Mch. Co., E. St. Louis, Ill.

BENDING MACHINES—Hand and Power

Cincinnati (Ohio) Shaper Co., The.

Dreis & Krump Mfg. Co., Cliveam.

G. D. S. Machinery & Supply Co., Inc.

101 Walker St., N. Y. C.

Niagara Machine & Tool Works, Buffalo, N. Y.

BENDING MACHINES—Hand, Band and Angle

Excelsior Tool & Mch. Co., E. St. Louis, Ill.

BENDING MACHINES—Hand and Power

Cincinnati (Ohio) Shaper Co., The.

Dreis & Krump Mfg. Co., Cliveam.

G. D. S. Machinery & Supply Co., Inc.

101 Walker St., N. Y. C.

Niagara Machine & Tool Works, Buffalo, N. Y.

BENZOL RECOVERY PLANTS

Koppers Co., Pittsburgh.

BERILLIUM COPPER

American Brass Co., The, Waterbury, Conn.

BILLETS—Chrome Nickel Steel

Rustless Iron & Steel Corp., Baltimore, Md.

BILLETS—Chrome Steel

Rustless Iron & Steel Corp., Baltimore, Md.

BILLETS—Forging

Alan Wood Steel Co., Conshohocken, Pa.

Harrisburg (Pa.) Steel Corp.

Midvale Co., The, Nicetown, Phila., Pa.

Republic Steel Corp., Cleveland, Ohio.

BILLETS—Re-rolling

Alan Wood Steel Co., Conshohocken, Pa.

BILLETS—Steel

Bethlehem (Pa.) Steel Company.

Continental Steel Corp., Kokomo, Ind.

Tennessee Coal, Iron & Railroad Co.

(U. S. Steel Corp. Subsidiary), Birmingham, Ala.

BIMETAL—Thermostatic

Chace, W. M., Co., 1695 Beard Ave., Detroit.

BINS—Rotating

Frick-Gallagher Mfg. Co., The, Wellston, Ohio.

BLANKS—Chisel

Cleveland Steel Tool Co., The, 660 E.

82nd St., Cleveland, Ohio.

BLANKS—Gear and Pinion

Chicago (Ill.) Rawhite Mfg. Co., The,

1306 Elston Ave.

Richardson Co., The, Melrose Park, Ill.

BLANKS—Gear, Silent Steel

Waldron, John, Corp., New Brunswick, N. J.

BLAST CLEANING EQUIPMENT

American Foundry Equipment Co., The,

401 Byrkit St., Mishawaka, Ind.

Pangborn Corporation, Hagerstown, Md.

BLAST FURNACES

Brasert, H. A., & Co., Chicago, Ill.

BLAST GATES

Rockwell, W. S., Co., 50 Church St., N. Y. C.

BLOCKS—Chain

Yale & Towne Mfg. Co., The, Phila. Div., Phila., Pa.

BLOWERS

American Air Filter Co., Inc., Louisville, Ky.

American Blower Corp., 6000 Russell St., Detroit.

Ingersoll-Rand Co., 11 Broadway, N. Y. C.

North American Mfg. Co., The, Cleveland.

Spencer Turbine Co., Hartford, Conn.

BLOWPIPES—Oxy-Acetylene Welding & Cutting

Linde Air Products Company, The, 30 East

42nd St., N. Y. C.

Weldit Acetylene Co., Detroit.

BLOWPIPES—Soldering, Heating, Annealing

American Gas Furnace Co., Elizabeth, N. J.

Weldit Acetylene Co., Detroit.

BOILERS

Munroe R. & Sons Mfg. Corp., Pittsburgh.

BOILERS—Waste Heat

Babcock & Wilcox Co., The, 85 Liberty St., New York City.

BOILERS—Water Tube

Babcock & Wilcox Co., The, 85 Liberty St., New York City.

BOLT CUTTERS

Acme Machinery Co., Cleveland.

Landis Mch. Co., Inc., Waynesboro, Pa.

BOLT AND NUT MACHINERY

Acme Machinery Co., Cleveland.

Ajax Mfg. Co., The, Euclid, Ohio.

Landis Mch. Co., Inc., Waynesboro, Pa.

Manville, E. L., Mch. Co., Waterbury, Ct.

Waterbury (Ct.) Farrel Edry. & Mch. Co., The.

BOLT & RIVET CLIPPERS

Bremill Mfg. Co., Erie, Pa.

Helwin Mfg. Co., St. Paul, Minn.

BOLTS—Carriage and Machine

Cleveland (Ohio) Cap Screw Co., The, Erie (Pa.) Bolt & Nut Co.

Lamson & Sessions Co., The, Cleveland.

Oliver Iron & Steel Corp., Pittsburgh.

Republic Steel Corp., Upson Nut Div., Cleveland, O.

Russell, Burdsall & Ward Bolt & Nut Co., Port Chester, N. Y.

Products Index

BOLTS—Special
Erie (Pa.) Bolt & Nut Co.
Lamson & Sessions Co., The, Cleveland.
Oliver Iron & Steel Corp., Pittsburgh.
Republic Steel Corp., Upson Nut Div.,
Cleveland, O.
Russell, Burdsall & Ward Bolt & Nut
Co., Port Chester, N. Y.

BOLTS—Special, Hot or Cold Upset
Lamson & Sessions Co., The, Cleveland.
Oliver Iron & Steel Corp., Pittsburgh.

BOLTS—Stove
Blake & Johnson Co., The, Waterville, Ct.
Lamson & Sessions Co., The, Cleveland.

BOLTS—Track
Carnegie-Illinois Steel Corp. (U. S. Steel
Corp. Subsidiary), Pittsburgh & Chi-
cago.
Republic Steel Corp., Upson Nut Div.,
Cleveland, O.

BOLTS AND NUTS
Clark Bros. Bolt Co., Milldale, Conn.
Erie (Pa.) Bolt & Nut Co.
Lamson & Sessions Co., The, Cleveland.
Oliver Iron & Steel Corp., Pittsburgh.
Republic Steel Corp., Cleveland, Ohio.
Russell, Burdsall & Ward Bolt & Nut
Co., Port Chester, N. Y.

BOLTS AND NUTS—Self-Locking

Lamson & Sessions Co., The, Cleveland, O.

BOND—Grinding Wheel
Bakelite Corp., 247 Park Ave., N. Y. C.

BOOTHES—Spray
DeVilbiss Co., The, Toledo, Ohio.

BORING BARS
Bullard Co., The, Bridgeport, Conn.

**BORING, DRILLING & MILLING MA-
CHINES—Horizontal**

Hill-Clarke Mchry. Co., 647 W. Wash-
ington Blvd., Chicago.
Lucas Machine Tool Co., Cleveland.
National Automatic Tool Co., Richmond
Ind.

**BORING & DRILLING MACHINES—
Vertical**

Baker Bros., Inc., Toledo, Ohio.
Bullard Co., The, Bridgeport, Conn.

BORING MACHINES—Diamond

Ex-Cell-O Corp., 1200 Oakman Blvd., De-
troit.

**BORING MACHINES—Diamond & Car-
bide Tools**

Heald Mch. Co., Worcester, Mass.

BORING MACHINES—Diamond

Ex-Cell-O Corp., 1200 Oakman Blvd., De-
troit.

BORING & TURNING MILLS—Vertical

Bullard Co., The, Bridgeport, Conn.
Cincinnati (Ohio) Planer Co.

Rogers Machine Wks., Alfred, New York.

BOX STRAPPING

Acme Steel Co., Chicago, Ill.

**BRAKE LINING AND BLOCKS—Asbes-
tos**

Manhattan Rubber Mfg. Div. of Ray-
bestos-Manhattan, Inc., The, 2 Town-
send St., Passaic, N. J.

BRAKES—Electric

Cutler-Hammer, Inc., Milwaukee.

PRAKES—Electric & Mechanical

Electric Controller & Mfg. Co., The,
Cleveland.

BRAKES—Magnetic

Stearns Magnetic Mfg. Co., 635 So. 28th
St., Milwaukee.

BRAKES—Metal Forming

Cincinnati (Ohio) Shaper Co., The.

Dreis & Krump Mfg. Co., Chicago.

Peck, Stow & Wilcox Co., The, Southing-
ton, Conn.

Schatz Mfg. Co., The, Poughkeepsie, N. Y.

Steelweld Machinery Co., Cleveland.

BRICK—Aid Resisting

Kearse Brick Co., Steubenville, Ohio.

BRICK—Fire Clay

Carborundum Co., The, Niagara Falls, N. Y.

Illinois Clay Products Co., Joliet, Ill.

Kegler Brick Co., Steubenville, Ohio.

Quigley Co., Inc., 56 West 45th St.,
N. Y. C.

BRICK—Insulating

Babcock & Wilcox Co., The, 85 Liberty
St., New York City.

BRIDGE BUILDERS

American Bridge Co. (U. S. Steel Corp.
Subsidiary), Pittsburgh.

**BRIDGE OPERATING MACHINERY—
Movable**

Earl Gear & Mch. Co., Philadelphia.

BRIGUETS—Ferroalloy

Electro Metallurgical Sales Corp., 30 East
42nd St., N. Y. C.

PROACHING MACHINES

Bullard Co., The, Bridgewater, Conn.

Cincinnati (Ohio) Milling Mch. Co., The.

Oilgear Co., The, 1311 W. Bruce St., Mil-
waukee.

BRONZE FOR DIES

Ampco Metal, Inc., Milwaukee, Wis.

BRONZE—Phosphor

Bunting Brass & Bronze Co., Toledo, Ohio.

Phosphor Bronze Smelting Co., The, Phila.

Revere Copper & Brass, Inc., 230 Park
Ave., N. Y. C.

Seymour (Conn.) Mfg. Co.

BRUSHES—Machine

Pittsburgh Plate Glass Co., Brush Div.,
Baltimore, Md.

BRUSHES—Wire
Pittsburgh Plate Glass Co., Brush Div.,
Baltimore, Md.

BUCKETS—Clamshell
Blaw-Knox Co., Pittsburgh.
Hayward Co., The, 50 Church St., N. Y. C.

BUCKETS—Electric Motor
Hayward Co., The, 50 Church St., N. Y. C.

BUCKETS—Orange Peel
Hayward Co., The, 50 Church St., N. Y. C.

BUFFERS & POLISHING MACHINES

Packer Machine Co., The, Meriden, Conn.

BUFFING APPLICATORS—Automatic

Packer Machine Co., The, Meriden, Conn.

BUILDINGS—Factory

Ferguson, H. K., Co., The, Cleveland.

BUILDINGS—Steel

American Bridge Co. (U. S. Steel Corp.
Subsidiary), Pittsburgh.
Belmont Iron Works, Philadelphia.

Bethlehem (Pa.) Steel Co.

Blaw-Knox Co., Pittsburgh.

Ferguson, H. K., Co., The, Cleveland.

Iron & Steel Products, Inc., Chicago.

BULLDOZERS

Ajax Mfg. Co., The, Euclid, Ohio.

Beatty Mch. & Mfg. Co., 336-150th St.,
Hammond, Ind.

Steelweld Machinery Co., Cleveland.

BULLDOZERS—Hydraulic

Elmes, Chas. F., Engng. Wks., Chicago.

BURNERS—Oil or Gas

North American Mfg. Co., The, Cleveland.

Wilson, Lee Engineering Co., The, Cleve-
land.

BUSHINGS—Bronze

Ampco Metal, Inc., Milwaukee, Wis.

Bunting Brass & Bronze Co., Toledo, Ohio.

Johnson Bronze Co., 505 So. Mill St., New
Castle, Pa.

Lawrenceville Bronze Co., Pittsburgh.

Phosphor Bronze Smelting Co., The, Phila.

Shenango-Penn Mold Co., Pittsburgh.

BUSHINGS—Oilless

Rhoades, R. W., Metaline Co., Inc., Long
Island City, N. Y.

BUSHINGS—Phosphor Bronze

Bunting Brass & Bronze Co., Toledo, Ohio.

Phosphor Bronze Smelting Co., The, Phila.

**BY-PRODUCTS COKE AND GAS
OVENS**

Koppers Co., Pittsburgh.

CABINETS—Stock

Frick-Gallagher Mfg. Co., The, Wellston.

CABLE—Electric

General Electric Co., Schenectady, N. Y.

Lincoln Electric Co., The, Cleveland.

CABLEWAYS AND TRAMWAYS—See
Tramways

CADMIUM

Du Pont de Nemours, E. I., & Co., Inc.

Grasselli Chemicals Dept., Wilmington,
Del.

Udylite Co., The, Detroit.

CADMIUM PLATING PROCESS

Du Pont de Nemours, E. I., & Co., Inc.

Grasselli Chemicals Dept., Wilmington,
Del.

Udylite Co., The, Detroit.

CARBIC

Linde Air Products Company, The, 30 East

42nd St., N. Y. C.

Linde Air Products Company, The, 30 East

42nd St., N. Y. C.

CARBIDE—Boron

Air Reduction Sales Co., 60 East 42nd

St., N. Y. C.

CARBURIZING BOXES

Electro Alloys Co., Elyria, Ohio.

CARBURIZING—See Heat Treating

CARS—Railway

Iron & Steel Products, Inc., Chicago.

CARS—Industrial and Mining

Atlas Car & Mfg. Co., The, Cleveland.

Bartlett, C. O., Snow Co., The, Cleveland.

CASE HARDENING—See Heat Treating

CASTINGS—Acid or Heat Resisting

Ampco Metal, Inc., Milwaukee, Wis.

Duriron Co., Inc., The, 438 N. Findlay

St., Dayton, Ohio.

CASTINGS—Alloy Iron

Bissell Steel Co., The, Cleveland.

Dodge Steel Co., Philadelphia, Pa.

Electro Alloys Co., Elyria, Ohio.

Hartford (Conn.) Electric Steel Corp.

Lebanon (Pa.) Steel Foundry.

Midvale Co., The, Nicetown, Phila., Pa.

Mehanite Metal Corp., Pittsburgh.

CASTINGS—Alloy Steel

Bissell Steel Co., The, Cleveland.

Dodge Steel Co., Philadelphia, Pa.

Electro Alloys Co., Elyria, Ohio.

Hartford (Conn.) Electric Steel Corp.

Lebanon (Pa.) Steel Foundry.

Mackintosh-Hempill Co., Pittsburgh.

Midvale Co., The, Nicetown, Phila., Pa.

The Iron Age

is read by executives in charge of
production, engineering, administration
and purchasing throughout the man-
ufacturing and metals-producing plants
of the metal working industry.

Ask any Iron Age representative to
show you.

GOSS and de LEEUW
MULTIPLE SPINDLE
CHUCKING MACHINES

Two, Four, Five Spindles • Work and Tool Rotating Types

GOSS & de LEEUW MACHINE CO., NEW BRITAIN, CONN.

Strand
Grinding
Polishing
Sanding
Drilling
Reaming
Flexible Shafts and Machines
Vertical and Horizontal Types— $\frac{1}{2}$ to 2 H.P.
Send for General Catalog
N. A. STRAND & CO.
5001 No. Lincoln St. Chicago

**Cutting Off
Machines for
Sawing All Kinds
of Metals**

THE ESPEN-LUCAS MACHINE WORKS
FRONT AND GIRARD AVE., PHILADELPHIA, PENNA.

Famous for quality of threads they
produce, long life of chasers and
all-round dependability.

Following literature available:

Bulletin on H & G General Purpose Die Heads.

Bulletin on new Insert Chaser Type of Die Head.

Bulletin on H & G Threading Machines.

See our Advt., page 138, Nov. 4th Iron Age.

The Eastern Machine Screw Corp.

21-41 Barley Street, New Haven, Conn.

Los Angeles: A. C. Behringer, 312 Commercial St.,

Los Angeles, Cal. San Francisco: Guy Reynolds, 464

Vernon St., Oakland, California.

**THE CLEVELAND CO.
STEEL TOOL CO.**

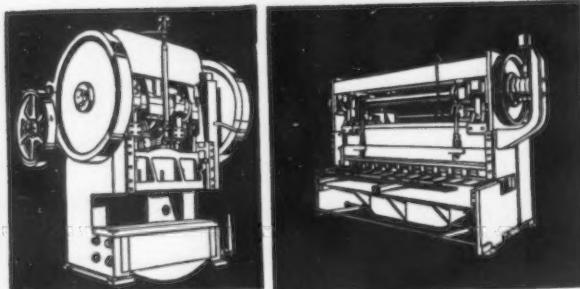
Punches, Dies, Chisels, Rivet Sets

560 E. 82nd St. Cleveland, O.

If it's RIVETED you KNOW it's safe

**PRESSES
FEEDS
AUTOMATIC EQUIPMENT**
THE V&O Press Co.
HUDSON, N. Y.

CHICAGO STEEL BRAKES —PRESSES—SHEARS



DREIS & KRUMP MFG. CO.
7430 LOOMIS BLVD. CHICAGO, ILL.

GRiffin

COLD ROLLED STRIP STEEL

1/2" to 19" wide.
.002" to .500" thick
Desired Quality for
Forming and Drawing

GRiffin MFG. CO. ERIE, PENNA.

STANLEY STEEL

STEEL MAKERS SINCE 1871
BILLETS - SLABS - STRIP STEEL
THE STANLEY WORKS
NEW BRITAIN, CONN. - BRIDGEPORT, CONN. - HAMILTON, ONTARIO



WETHERELL BROS. CO.
251 Albany St., Cambridge, Mass.
C. R. Strip
Tool Steel
Stainless Steel
O H Specialties

STAINLESS STEEL

ALSO
HIGH SPEED and CARBON TOOL STEELS
LATROBE ELECTRIC STEEL CO. LATROBE, PA.

THE "DARWIN" OF PIONEERS OF MODERN QUANTITY PRODUCTION ALLOY - TOOL - STEELS

DARWIN & MILNER, INC. 1260 W. 4TH ST. CLEVELAND, OHIO

Products Index

CASTINGS—Aluminum
Aluminum Co. of America, Pittsburgh.
Fairmount Foundry, Inc., Phila., Pa.

CASTINGS—Brass, Bronze, Copper or Aluminum
Cadman, A. W., Mfg. Co., Pittsburgh.
Carbon Malleable Casting Co., Inc., Lancaster, Pa.

Lawrenceville Bronze Co., Pittsburgh.
National Bearing Metals Corp., Pittsburgh.
Phosphor Bronze Smelting Co., The, Phila.
Snyder, W. F., & Co., Pittsburgh.

Spencer's, I. S., Sons, Inc., Guilford, Ct.

CASTINGS—Corrosion Resisting
Electro Alloys Co., Elyria, Ohio.
Mechanite Metal Corp., Pittsburgh.

Midvale Co., The, Nicetown, Phila., Pa.

CASTINGS—Die, Aluminum
Aluminum Co. of America, Pittsburgh.

CASTINGS—Electric Steel
Crucible Steel Castings Co., Lansdowne, Pa.
Dodge Steel Co., Philadelphia, Pa.
Lebanon (Pa.) Steel Foundry.

CASTINGS—Gray Iron
American Engineering Co., Philadelphia.
Cheney, S., & Son, Manlius, N. Y.
Commercial Steel Casting Co., Marion, Ohio.

Fairmount Foundry, Inc., Phila., Pa.
Laconia (N. H.) Malleable Iron Co., Inc.
Lane Mfg. Co., Montpelier, Vt.

Midvale Co., The, Nicetown, Phila., Pa.
Murray Iron Wks. Co., Burlington, Iowa.

National Roll & Fdry. Co., Avonmore, Pa.
North Wales (Pa.) Mach. Co., Inc.

Spencer's, I. S., Sons, Inc., Guilford, Ct.

CASTINGS—High Test & Alloy Iron
Mechanite Metal Corp., Pittsburgh.

CASTINGS—Magnesium Alloys
Dow Chemical Co., The, 921 Jefferson Ave., Midland, Mich.

CASTINGS—Malleable
Baltimore (Md.) Malleable Iron & Steel Casting Co., Pa.

Carbon Malleable Casting Co., Inc., Lancaster, Pa.

Laconia (N. H.) Malleable Iron Co., Inc.
Lake City Malleable Co., The, 5100 Lakeside Ave., Cleveland.

Malleable Iron Fittings Co., Branford, Ct.
Pearl (Ill.) Malleable Castings Co.

CASTINGS—Mechanite Metal
Mechanite Metal Corp., Pittsburgh.

CASTINGS—Monel & Nickel
Superior Bronze Corp., Erie, Pa.

CASTINGS—Semi-Steel
Malleable Iron Fittings Co., Branford, Ct.

CASTINGS—Steel
Bethlehem (Pa.) Steel Company.
Birdsboro (Pa.) Steel Foundry & Machine Co.

Carnegie-Illinoi Steel Corp. (U. S. Steel Corp., Subsidiary), Pittsburgh & Chicago.

Columbia Steel Co. (U. S. Steel Corp., Subsidiary), San Francisco, Calif.
Commercial Steel Casting Co., Marion, Ohio.

Crucible Steel Castings Co., Lansdowne, Pa.
Dodge Steel Co., Philadelphia, Pa.
Hartford (Conn.) Electric Steel Corp.
Lebanon (Pa.) Steel Foundry.

Mackintosh-Hempill Co., Pittsburgh.
Malleable Iron Fittings Co., Branford, Ct.
Mesta Mch. Co., Pittsburgh.

Midvale Co., The, Nicetown, Phila., Pa.
Standard Steel Wks. Co., Burnham, Pa.

CASTINGS—Wear Resisting
Mechanite Metal Corp., Pittsburgh.

CEMENT—Acid-Proof
Atlas Mineral Products Co. of Pa., The, Mertztown, Pa.

Nukem Products Corp., 68 Niagara St., Buffalo, N. Y.

Pennsylvania Salt Mfg. Co., Philadelphia, Pa.

CEMENT—Refractory
Carborundum Co., The, Perth Amboy, N. J.
Johns-Manville Corp., 22 East 40th St., New York City.

Quigley Co., Inc., 56 West 45th St., N. Y. C.

CEMENT—Rubber
Goodrich, B. F., Co., The, Akron, Ohio.

CHAINS—Conveyor & Elevator
Baldwin-Duckworth Chain Corp., Springfield, Mass.

Bartlett, C. O.-Snow Co., The, Cleveland.
Diamond Chain & Mfg. Co., Indianapolis, Ind.

Webster Mfg. Co., Chicago.

CHAINS—Portable
Barrett Cravens Co., Chicago, Illinois.

CHAINS—Power Transmission
Baldwin-Duckworth Chain Corp., Springfield, Mass.

Bartlett, C. O.-Snow Co., The, Cleveland.
Diamond Chain & Mfg. Co., Indianapolis, Ind.

Boston Gear Works, Inc., North Quincy, Mass.

Diamond Chain & Mfg. Co., Indianapolis, Ind.

Link-Belt Co., Chicago.

Morse Chain Co., Ithaca, New York.
Ramsey Chain Co., Inc., Albany, N. Y.

Webster Mfg. Co., Chicago.

Whitney Chain & Mfg. Co., Hartford, Ct.

CHAINS—Roller
Baldwin-Duckworth Chain Corp., Springfield, Mass.

Bartlett, C. O.-Snow Co., The, Cleveland.
Diamond Chain & Mfg. Co., Indianapolis, Ind.

Link-Belt Co., Chicago.

Morse Chain Co., Ithaca, New York.

Whitney Chain & Mfg. Co., Hartford, Ct.

COKE OVEN MACHINERY
Atlas Car & Mfg. Co., The, Cleveland.
Koppers Co., Pittsburgh.

COKE OVENS—By-Products
Koppers Co., Pittsburgh.

COKE OVENS—Cross Regenerators
Koppers Co., Pittsburgh.

COKE OVENS—with Recovery of By-Products
Koppers Co., Pittsburgh.

COLLETS
Rivett Lathe & Grinder, Inc., Boston, Mass.

COLUMBIUM
Electro Metallurgical Sales Corp., 30 E. 42nd St., N. Y. C.

CHAINS—Silent
Link-Belt Co., Chicago.
Morse Chain Co., Ithaca, New York.
Ramsey Chain Co., Inc., Albany, N. Y.
Whitney Chain & Mfg. Co., Hartford, Ct.

CHANNELS—See Angles, Beams, Channels and Tees

CHECKS—Metal
Cunningham, M. E., Co., Pittsburgh.
Noble & Westbrook Mfg. Co., The, East Hartford, Ct.

CHEMICALS—Industrial
Du Pont de Nemours, E. I., & Co., Inc.
Grasselli Chemicals Dept., Wilmington, Del.
Pennsylvania Salt Mfg. Co., Philadelphia, Pa.

CHEMICALS—Rust Proofing
Parker Rust-Proof Co., 2186 Milwaukee Ave., Detroit.
Udylite Co., The, Detroit.

CHROMIUM METAL & ALLOYS
Electro Metallurgical Sales Corp., 30 East 42nd St., N. Y. C.

CHUCKING MACHINES—Multiple Spindle
Baird Mch. Co., The, Bridgeport, Conn.
Goss & DeLeeuw Machine Co., New Britain, Conn.
National Acme Co., The, Cleveland.

CHUCKS—Air Operated
Hannifin Mfg. Co., Chicago.

CHUCKS—Drill
Cleveland (Ohio) Twist Drill Co., The.
Cushman Chuck Co., Hartford, Conn.
Morse Twist Drill & Mach. Co., New Bedford, Mass.

CHUCKS—Electric
Cushman Chuck Co., Hartford, Conn.

CHUCKS—Lathe
Cushman Chuck Co., Hartford, Conn.

CHUCKS—Magnetic
Heald Mch. Co., Worcester, Mass.
Taft-Petree Mfg. Co., The, Woonsocket, R. I.

CIRCLES—Phosphor Bronze
Phosphor Bronze Smelting Co., The, Phila.
Revere Copper & Brass, Inc., 230 Park Ave., N. Y. C.

CLEANERS—Metal
American Chemical Paint Co., Ambler, Pa.
Detroit Rex Products Co., Detroit, Mich.
Ford, J. B., Co., The, Wyandotte, Mich.
Pennsylvania Salt Mfg. Co., Phila., Pa.

CLEANING COMPOUNDS—Alkali
Detroit Rex Products Co., Detroit, Mich.
Pennsylvania Salt Mfg. Co., Philadelphia, Pa.

CLEANING EQUIPMENT—Metal
Detroit Rex Products Co., Detroit, Mich.

CLEANING EQUIPMENT (Metal)—Electro-Chemical
Bullard Co., The, Bridgeport, Conn.

CLOTHING—Asbestos & Fireproof
Safety Equipment Service Co., Cleveland.

CLUTCHES—Magnetic
Stearns Magnetic Mfg. Co., 635 So. 28th St., Milwaukee.

CLUTCHES
Fairbanks, Morse & Co., Chicago.
Falls Clutch & Mchry. Co., The, Cuyahoga Falls, Ohio.

Jones, W. A., Fdry. & Mch. Co., 4401 Roosevelt Rd., Chicago.

Medart Co., The, St. Louis, Mo.
Morse Chain Co., Ithaca, New York.

CLUTCHES—Magnetic
Cutler-Hammer, Inc., Milwaukee.

Dings Magnetic Separator Co., Milwaukee.
Stearns Magnetic Mfg. Co., 635 So. 28th St., Milwaukee.

COAL
Cleveland-Cliffs Iron Co., The, Cleveland, Ohio.

Hanna Furnace Corp., The, Detroit, Mich.
Koppers Coal Co., Inc., The, Pittsburgh.
Picksand Mather & Co., Cleveland.

COAL, ORE AND ASH HANDLING MACHINERY
Bartlett, C. O.-Snow Co., The, Cleveland.
Robins Conveying Belt Co., 15 Park Row, N. Y. C.

COBALT METAL
Central Trading Corp., 511 Fifth Ave., N. Y. C.

COILS—Lead
National Lead Co., 111 Broadway, N. Y. C.

COILS—Pipe
Harrisburg (Pa.) Steel Corp.

COKE
Metallurgical Cleveland-Cliffs Iron Co., The, Cleveland, Ohio.

COKE OVEN MACHINERY
Atlas Car & Mfg. Co., The, Cleveland.
Koppers Co., Pittsburgh.

COKE OVENS—By-Products
Koppers Co., Pittsburgh.

COKE OVENS—Cross Regenerators
Koppers Co., Pittsburgh.

COKE OVENS—with Recovery of By-Products
Koppers Co., Pittsburgh.

Products Index

COMBUSTION CONTROLS

Brown Instrument Co., The, Philadelphia, Pa.

Leeds & Northrup Co., Philadelphia.

Morgan Construction Co., Worcester, Mass.

Norin American Mfg. Co., The, Cleveland.

COMPOUNDS—Drawing

Gulf Oil Corp., Gulf Refining Co., Pittsburgh.

Socony-Vacuum Oil Co., Inc., 26 Broadway, N. Y. C.

Standard Oil Co. (Indiana), Chicago.

Tide Water Associated Oil Co., 17 Battery Place, N. Y. C.

COMPRESSORS—Air

Curtis Pneumatic Machinery Co., 1948 Kienlen Ave., St. Louis, Mo.

Fairbanks, Morse & Co., Chicago.

Ingersoll-Rand Co., 11 Broadway, New York City.

Pennsylvania Pump & Compressor Co., Easton, Pa.

Spencer Turbine Co., Hartford, Conn.

Sullivan Machinery Co., Michigan City, Ind.

Westinghouse Air Brake Co., Industrial Div., Pittsburgh.

Worthington Pump & Machinery Corp., Harrison, N. J.

COMPRESSORS—Gas

Sullivan Machinery Co., Michigan City, Ind.

Worthington Pump & Machinery Corp., Harrison, N. J.

COMPRESSORS—Rebuilt. (See Clearing House Section)

CONCRETE CONSTRUCTION

Ferguson, H. K., Co., The, Cleveland.

CONDENSERS—Surface & Jet

Ingersoll-Rand Co., 11 Broadway, N.Y.C.

Pennsylvania Pump & Compressor Co., Easton, Pa.

Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.

Worthington Pump & Machinery Corp., Harrison, N. J.

CONDUITS—Flexible Metallic

Pennsylvania Flexible Metallic Tubing Co., Philadelphia.

CONTRACTORS' SUPPLIES—Second-Hand. (See Clearing House Section)

CONTROL SYSTEMS—Temperature

Leeds & Northrup Co., Philadelphia.

CONTROLLERS—Crane

Cutter-Hammer, Inc., Milwaukee.

CONTROLLERS—Electric

Cutter-Hammer, Inc., Milwaukee.

Electric Controller & Mfg. Co., The, Cleveland.

General Electric Co., Schenectady, N. Y.

CONTROLLERS—Valve, Electrically Operated

Brown Instrument Co., The, Philadelphia, Pa.

Cutter-Hammer, Inc., Milwaukee.

Leeds & Northrup Co., Philadelphia.

CONVEYING AND ELEVATING MACHINERY

Bartlett, C. O., Snow Co., The, Cleveland.

Link-Belt Co., Chicago.

Logan Co., Inc., Louisville, Ky.

Mathews Conveyor Co., Elwood City, Pa.

Robins Conveying Belt Co., 15 Park Row, N. Y. C.

CONVEYOR WORMS

Lee Spring Co., Inc., 30 Main St., Brooklyn, N. Y.

CONVEYORS—Gravity

Logan Co., Inc., Louisville, Ky.

Mathews Conveyor Co., Elwood City, Pa.

CONVEYORS—Monorail

American Monorail Co., The, Cleveland.

Cleveland Tramrail Div. of The Cleveland Crane & Engng. Co., Wickliffe, Ohio.

CONVEYORS—Portable

Parquhar, A. B., Co., Ltd., York, Pa.

Robins Conveying Belt Co., 15 Park Row, N. Y. C.

COPING MACHINES

Schmitz Mfg. Co., The, Poughkeepsie, N. Y.

CORE OIL

Socony-Vacuum Oil Co., Inc., 26 Broadway, N. Y. C.

Sun Oil Co., Philadelphia.

Tide Water Associated Oil Co., 17 Battery Place, N. Y. C.

CORUNDUM WHEELS—See Grinding Wheels

COTTERS AND KEYS—Spring

Hindley Mfg. Co., Valley Falls, R. I.

Hubbard, M. D., Spring Co., 750 Central Ave., Pontiac, Mich.

Lamson & Sessions Co., The, Cleveland.

Western Wire Prod. Co., St. Louis, Mo.

COUNTERBORES

Cleveland (Ohio) Twist Drill Co., The.

Morse Twist Drill & Mfg. Co., New Bedford, Mass.

COUNTERS—Production

Durant Mfg. Co., Milwaukee, Wis.

Veeder-Root, Inc., Hartford, Ct.

COUNTERS—Revolution, Recording

Durant Mfg. Co., Milwaukee, Wis.

COUNTING MACHINES

Veeder-Root, Inc., Hartford, Conn.

COPPLINGS—Air Hose

Cleveland (Ohio) Pneumatic Tool Co., The.

COPPLINGS—Cut-off Friction

Jones, W. A., Fdry. & Mch. Co., 4401 Roosevelt Rd., Chicago.

COUPLINGS—Flexible

Diamond Chain & Mfg. Co., Indianapolis, Ind.

Lovejoy Flexible Coupling Co., Chicago.

Morse Chain Co., Ithaca, New York.

Poole Foundry & Mch. Co., Baltimore, Md.

Walmsley Chain Co., Inc., Albany, N. Y.

Waldron, John, Corp., New Brunswick, N. J.

COUPLINGS—PIPE

Harrisburg (Pa.) Steel Corp.

National Tube Co. (U. S. Steel Corp. Subsidiary), Pittsburgh.

CRANES—Crawling Tractor

Browning Crane & Shovel Co., Cleveland.

Harnischfeger Corp., 4401 W. National Ave., Milwaukee.

Industrial Brownhoist Corp., Bay City, Mich.

Ohio Locomotive Crane Co., The, Bucyrus, Ohio.

CRANES—Electric, Industrial, Truck Mounted

Baker-Raulang Co., The, 2175 W. 25th St., Cleveland.

Browning Crane & Shovel Co., Cleveland.

Elwell-Parker Electric Co., The, Cleveland.

CRANES—Electric Traveling

Armel, James P., Pittsburgh.

Cleveland Crane & Engineering Co., Wickliffe, Ohio.

Conco Engineering Works, Mendota, Ill.

Curtis Pneumatic Machinery Co., 1948 Kienlen Ave., St. Louis, Mo.

Electric Hoist & Motor Co., 149 N. 9th St., Bklyn., N. Y.

Euclid Crane & Hoist Co., The, Euclid, O.

Harnischfeger Corp., 4401 W. National Ave., Milwaukee.

Maris Brothers, Inc., Philadelphia.

Northern Engineering Works, Detroit.

Robins Crane & Hoist Div., Muskegon, Mich.

Shepard Niles Crane & Hoist Corp., Monroe Falls, N. Y.

Whiting Corp., Harvey, Ill.

CRANES—Gantry

Browning Crane & Shovel Co., Cleveland.

Cleveland Crane & Engineering Co., Wickliffe, Ohio.

Industrial Brownhoist Corp., Bay City, Mich.

Maris Brothers, Inc., Philadelphia.

Northern Engineering Works, Detroit.

Shaw-Box Crane & Hoist Div., Manning, Maxwell & Moore, Inc., 402 Broadway, Muskegon, Mich.

Whiting Corp., Harvey, Ill.

CRANES—Locomotive

Browning Crane & Shovel Co., Cleveland.

Harnischfeger Corp., 4401 W. National Ave., Milwaukee.

Industrial Brownhoist Corp., Bay City, Mich.

Ohio Locomotive Crane Co., The, Bucyrus, O.

CRANES—Monorail

American Monorail Co., The, Cleveland.

Cleveland Tramrail Div. of The Cleveland Crane & Engng. Co., Wickliffe, Ohio.

Euclid Crane & Hoist Co., The, Euclid, O.

Harnischfeger Corp., 4401 W. National Ave., Milwaukee.

Industrial Brownhoist Corp., Bay City, Mich.

Maris Brothers, Inc., Philadelphia.

Northern Engineering Works, Detroit.

Shaw-Box Crane & Hoist Div., Manning, Maxwell & Moore, Inc., 402 Broadway, Muskegon, Mich.

Whiting Corp., Harvey, Ill.

CRANES—Portable

Curtis Pneumatic Machinery Co., 1948 Kienlen Ave., St. Louis, Mo.

Euclid Crane & Hoist Co., The, Euclid, O.

Harnischfeger Corp., 4401 W. National Ave., Milwaukee.

Industrial Brownhoist Corp., Bay City, Mich.

CRANES—Press

Browning Crane & Shovel Co., Cleveland.

Harnischfeger Corp., 4401 W. National Ave., Milwaukee.

Industrial Brownhoist Corp., Bay City, Mich.

CRANES—Semi-Portable

Browning Crane & Shovel Co., Cleveland.

Harnischfeger Corp., 4401 W. National Ave., Milwaukee.

Industrial Brownhoist Corp., Bay City, Mich.

CRANES—Truck

Browning Crane & Shovel Co., Cleveland.

Harnischfeger Corp., 4401 W. National Ave., Milwaukee.

Industrial Brownhoist Corp., Bay City, Mich.

CRANKSHAFTS

Transue & Williams Steel Forging Corp., Alliance, Ohio.

Union Drawn Steel Co., Massillon, Ohio.

CRANKSHAFTS—Forged

Bay City Forge Co., Erie, Pa.

CRUSHERS—Coal

American Pulverizer Co., 1439 Macklind Ave., St. Louis, Mo.

CRUSHERS—Steel Turning

American Pulverizer Co., 1439 Macklind Ave., St. Louis, Mo.

CUTTERS—Die Sinking

Pratt & Whitney Div., Niles-Bement-Pond Co., Hartford, Conn.

Tomkins-Johnson Co., The, Jackson, Mich.

ASECO EXPORTERS IRON and STEEL PRODUCTS

Offices and Agents
Throughout the World

AMERICAN STEEL EXPORT CO., INC.

347 Madison Ave., New York, N. Y., U. S. A.
Cable Address: "AMSTA"

DROP-FORGINGS

any shape
any material
UP-TO-DATE
FACILITIES
LABORATORY
HEAT-TREATING
SAND BLASTING
J. H. WILLIAMS & CO.
The Dropforging People
BUFFALO
NEW YORK CHICAGO

STEEL FORGINGS

UPSET, DROP and COIN PRESSED
ANY ANALYSIS—ANY QUANTITY

Send us your blue prints for prices

ROCKFORD DROP FORGE CO.

2030 9th St.
ROCKFORD, ILL.

HOLLOW BORED SPINDLES

Machine tools must have good spindles. That is why leading machine tool builders use American Hollow Bored products. Write for prices on American Hollow Bored spindles, shafts, rams and hydraulic cylinders.

AMERICAN HOLLOW BORING CO.

ERIE, PA.

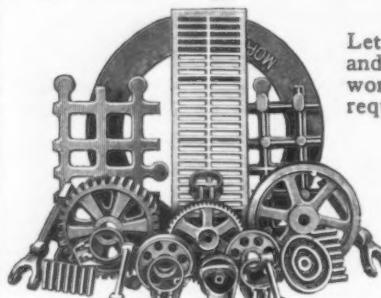
POOR AND COMPANY FORGINGS

Any Size Any Specification

CANTON FORGE & AXLE WORKS

2025 DUEBER AVE., S. W., CANTON, OHIO

Castings—The kind you want



MALLEABLE IRON FITTINGS CO.
BRANFORD, CONN.

Let us put our facilities
and long experience to
work on your casting
requirements.

Malleable Iron,
Semi-Steel, Low
and Special Carbon,
Nickel and Van-
dium Steel.



Certified
MALLEABLE IRON CASTINGS
Detachable Sprocket Chain
Riveted Sprocket Chain
Malleable Washers, etc.

PEORIA MALLEABLE CASTINGS CO.
AT 2800 N. ADAMS ST.
PEORIA, ILLINOIS

Carbon Malleable Casting Co.

INCORPORATED

HIGH GRADE MALLEABLE IRON CASTINGS OF UNIFORM QUALITY
AND HIGH STANDARD, WE SPECIALIZE ON TRUE TO PATTERN
WORK. ALSO BRASS AND ALUMINUM CASTINGS

724 S. Prince St. Lancaster, Pa.

NATIONAL BEARING METALS CORPORATION

ROLLING MILL BRONZE CASTINGS
Roll Neck Bearings Acid Resisting Castings
Locomotive Castings
BLAST FURNACE COPPER
Housing Nuts Machinery Castings
Car Journal Bearings
ALUMINUM BRONZE CASTINGS

Damascus & Keystone Bronze Div., • Chicago Div.
PITTSBURGH, PA. CLEARING, ILL.

HIGH GRADE OPEN HEARTH STEEL CASTINGS

1 lb. to 9 tons
Quick Deliveries

COMMERCIAL STEEL CASTING CO.
MARION, OHIO

From
a Pound
to a Ton

ELECTRIC *Inquiries
Solicited*

STEEL CASTINGS

CRUCIBLE STEEL CASTINGS COMPANY
LANSDOWNE, DELAWARE COUNTY, PENNSYLVANIA
(Near Philadelphia)

Products Index

CUTTERS—Keyseating
Davis Keyseater Co., 400 Exchange St.
Rochester, N. Y.

CUTTERS—Milling
Brown & Sharpe Mfg. Co., Providence, R. I.
Cleveland (Ohio) Twist Drill Co., The.
Ex-Cell-O Corp., 1200 Oakman Blvd., Detroit.
Morse Twist Drill & Mch. Co., New Bedford, Mass.
Pratt & Whitney Div., Niles-Bement-Pond Co., Hartford, Conn.

CUTTING-OFF MACHINES—Abrasives
Tabor Mfg. Co., Phila.

CUTTING-OFF MACHINES—Cold Saw
Eaton-Lucas Mch. Wks., Philadelphia.

CUTTING-OFF MACHINES—Pipe or
Tubing

Aetna-Standard Engineering Co., The,
Youngstown, Ohio.

Bardons & Oliver, Cleveland.

Landis Mch. Co., Inc., Waynesboro, Pa.

CUTTING AND WELDING APPARATUS

—Oxy-Acetylene—See Welding and Cut-

ting Machines and Equipment—Oxy-

Acetylene.

CYLINDERS—Compressed Air & Hy-

draulic

Hanna Engineering Works, 1761 Elston Ave., Chicago.

Tomkins-Johnson Co., The, Jackson, Mich.

CYLINDERS—Seamless

Harrisburg (Pa.) Steel Corp.

National Tube Co. (U. S. Steel Corp.

Subsidiary), Pittsburgh.

DEGREASING COMPOUNDS

Pennsylvania Salt Mfg. Co., Philadelphia, Pa.

DEGREASING MACHINES—Solvent

Detroit Rex Products Co., Detroit, Mich.

DEOXYDIZERS

Vanadium Corp. of America, 420 Lexington Ave., N. Y. C.

DICTATING MACHINES

Dictaphone Sales Corp., 420 Lexington Ave., New York City.

DIE-FILING MACHINES

Continental Machine Specialties, Inc., Minneapolis, Minn.

DIE SETS

U. S. Tool Co., Inc., Ampere, N. J.

DIE SINKING MACHINES—Automatic

Cincinnati (Ohio) Milling Mch. Co., The.

Pratt & Whitney Div., Niles-Bement-Pond Co., Hartford, Conn.

DIE-MAKING MACHINES—Automatic

Henry & Wright Mfg. Co., The, Hartford, Conn.

DIES—Cast Tool Steel

Forging & Casting Corp., The, Ferndale, Mich.

DIES, JIGS, FIXTURES, etc.

Atlantic Mfg. Co., Philadelphia.

Taff-Pelree Mfg. Co., The, Woonsocket, R. I.

DIES—Pipe Threading

Landis Mch. Co., Inc., Waynesboro, Pa.

Murphy Machine & Tool Co., Detroit.

DIES—Screw and Thread Cutting

Eastern Mach. Screw Corp., New Haven, Ct.

Greenfield (Mass.) Tap & Die Corp.

Jones & Lamson Mch. Co., Springfield, Vt.

Landis Mch. Co., Inc., Waynesboro, Pa.

Murphy Machine & Tool Co., Detroit.

DIES—Self-Opening Adjustable

Eastern Mach. Screw Corp., New Haven, Ct.

Jones & Lamson Mch. Co., Springfield, Vt.

Landis Mch. Co., Inc., Waynesboro, Pa.

Murphy Machine & Tool Co., Detroit.

DIES—Sheet Metal Working

Worcester (Mass.) Stamped Metal Co.

DIES—Steel Letters and Stamps

Cunningham, M. E. Co., Pittsburgh.

Noble & Westbrook Mfg. Co., The, East

Hartford, Ct.

DIES—Sheet Metal Working

Kinnear Mfg. Co., Columbus, Ohio.

DOORS & SHUTTERS—Fireproof

Kinnear Mfg. Co., Columbus, Ohio.

DOORS & SHUTTERS—Steel or Wood

Rolling

Kinnear Mfg. Co., Columbus, Ohio.

DRAWN WORK—Metal—See Stampings

or Drawings—Metal

DRILL FILING SYSTEMS

Hunt Mfg. Co., 500 Robert St., St. Paul, Minn.

DRILL HEADS—Hydraulic

National Automatic Tool Co., Richmond, Ind.

DRILL HEADS—Multiple

Baker Bros., Inc., Toledo, Ohio.

Ex-Cell-O Corp., 1200 Oakman Blvd., De-

rrison, N. J.

DRILL INDEX

Hunt Mfg. Co., 500 Robert St., St. Paul, Minn.

DRILLING MACHINES—Bench

Leland-Gifford Co., Worcester, Mass.

DRILLING MACHINES—Heavy Duty

Baker Bros., Inc., Toledo, Ohio.

DRILLING MACHINES—Multiple Spin

die

Baker Bros., Inc., Toledo, Ohio.

Henry & Wright Mfg. Co., The, Hartford, Conn.

National Automatic Tool Co., Richmond, Ind.

DRILLING MACHINES—Multiple Spin

die

National Automatic Tool Co., Richmond, Ind.

DRILLING MACHINES—Multiple Spin

die Adjustable

National Automatic Tool Co., Richmond, Ind.

DRILLING MACHINES—Multiple Spin

die Horizontal

Baker Bros., Inc., Toledo, Ohio.

National Automatic Tool Co., Richmond, Ind.

DRILLING MACHINES—Portable

Black & Decker Mfg. Co., The, Towson, Md.

Wodack Electric Tool Corp., Chicago.

DRILLING MACHINES—Portable Electric

Black & Decker Mfg. Co., The, Towson, Md.

Wodack Electric Tool Corp., Chicago.

DRILLING MACHINES—Portable Pneu-

matic

Cleveland (Ohio) Pneumatic Tool Co., The.

Helwig Mfg. Co., St. Paul, Minn.

Ingersoll-Rand Co., 11 Broadway, New

York City.

Warner & Swasey Co., The, Cleveland.

DRILLING MACHINES—Radial

Cincinnati (Ohio) Bickford Tool Co., The.

DRILLING MACHINES—Sensitive

Leland-Gifford Co., Worcester, Mass.

DRILLING MACHINES—Upright

Baker Bros., Inc., Toledo, Ohio.

Cincinnati (Ohio) Bickford Tool Co., The.

DRILLING MACHINES—Vertical

Baker Bros., Inc., Toledo, Ohio.

Cincinnati (Ohio) Bickford Tool Co., The.

DRIVES—Gear

Farrel-Birmingham Co., Inc., Buffalo, N. Y.

Mesta Mch. Co., Pittsburgh.

DRIVES—Single & Multiple V-Belts

Allis Chalmers Mfg. Co., Milwaukee.

DROP FORGINGS—See Forgings—Drop.

Iron or Steel

DROP HAMMERS—See Hammers—Drop

DUST COLLECTORS

Abrasive Machine Tool Co., East Prov-

idence, R. I.

American Air Filter Co., Inc., Louisville,

Ky.

American Blower Corp., 6000 Russell St.,

Detroit.

American Foundry Equipment Co., The,

101 Bykrt St., Mishawaka, Ind.

Blaw-Knox Co., Pittsburgh.

Pangborn Corporation, Hagerstown, Md.

Whiting Corp., Harvey, Ill.

ECONOMIZERS

Babcock & Wilcox Co., The, 85 Liberty St., New York City.

ELECTRIC HEATING ELEMENTS

Gehler Div., The, Carborundum Co., Niagara Falls, N. Y.

ELECTRIC LIGHTING—Industrial

General Electric Co., Cleveland.

General Electric Vapor Lamp Co., Hoboken, N. J.

ELECTRIC WELDING—See Welding—

ELECTRICAL EQUIPMENT

Allis-Chalmers Mfg. Co., Milwaukee.

General Electric Co., Schenectady, N. Y.

ELECTRICAL MACHINERY—Second

Hand. (See Clearing House Section)

ELECTRICAL WIRES

Udylite Co., The, Trenton, N. J.

ELECTRODE HOLDERS—Welding

Lincoln Electric Co., The, Cleveland.

ELECTRODES—Resistance Welding

Electrolytic Co., Inc., 59 Church St., New York City.

ELECTRODES—Welding, Coated

Electric Arc Cutting & Welding Co., The, Newark, N. J.

Harnischefger Corp., 4401 W. National Ave., Milwaukee.

Lincoln Electric Co., The, Cleveland.

Maurath, Inc., 7400 Union Ave., Cleveland.

Ursa Welding, Inc., Cleveland, Ohio.

ELECTROPLATING EQUIPMENT &

Udylite Co., The, Detroit.

ELEVATORS—Portable

Bartlett-Cravens Co., Chicago, Ill.

Lewis-Shepard Co., 122 Walnut St., Water-

town Station, Boston.

ELEVATORS—Steam Hydraulic

Ridgeway, Craig, & Son Co., Coatesville, Pa.

EMERY WHEELS—See Grinding Wheels

ENGINEERS & CONTRACTORS

Ferguson, H. K., Co., The, Cleveland.

ENGINEERS—Consulting and Industrial

Koppers Co., Pittsburgh.

ENGINES—Diesel

Ingersoll-Rand Co., 11 Broadway, N. Y. C.

Worthington Pump & Machinery Corp., The, Newark, N. J.

ENGINES—Gas

Fairbanks, Morse & Co., Chicago.

Worthington Pump & Machinery Corp., The, Newark, N. J.

ENGINES—Oil

Worthington Pump & Machinery Corp., The, Newark, N. J.

EYELET MACHINES

Manville, E. J. Mch. Co., Waterbury, Ct.

Waterbury (Conn.) Farrel Foundry & Ma-

chine Co., The.

FACING CLAY

Carborundum Co., The, Perth Amboy, N. J.

FACTORY & PLANT SITES

Stoll, Edward H., 196 Market St., Newark, N. J.

FANS—Ventilating

American Blower Corp., 6000 Russell St.,

Detroit.

DeVilbiss Co., The, Toledo, Ohio.

FEED WATER HEATERS AND PURI-

FIERS

Harrisburg (Pa.) Steel Corp.

FEEDS—Hydraulic, for Machines

Products Index

FENCING—Wire
Pittsburgh (Pa.) Steel Co.
FERROALLOYS
Climax Molybdenum Co., 500 Fifth Ave., N. Y. C.
Electro Metallurgical Sales Corp., 30 E. 42nd St., N. Y. C.
Ohio Ferro-Alloys Corp., Canton, Ohio.
Pittsburgh Metallurgical Co., Inc., Niagara Falls, N. Y.
Titanium Alloy Mfg. Co., The, Niagara Falls, N. Y.
Vanadium Corp. of America, 420 Lexington Ave., N. Y. C.
FERROCHROME
Electro Metallurgical Sales Corp., 30 E. 42nd St., N. Y. C.
Ohio Ferro-Alloys Corp., Canton, Ohio.
Pittsburgh Metallurgical Co., Inc., Niagara Falls, N. Y.
Samuel, Frank & Co., Inc., Philadelphia.
Vanadium Corp. of America, 420 Lexington Ave., N. Y. C.
FERROMANGANESE
Electro Metallurgical Sales Corp., 30 E. 42nd St., N. Y. C.
Ohio Ferro-Alloys Corp., Canton, Ohio.
Pittsburgh Metallurgical Co., Inc., Niagara Falls, N. Y.
Samuel, Frank & Co., Inc., Philadelphia.
FERROMOLYBDENUM
Climax Molybdenum Co., 500 Fifth Ave., N. Y. C.
Vanadium Corp. of America, 420 Lexington Ave., N. Y. C.
FERROSILICON MANGANESE
Ohio Ferro-Alloys Corp., Canton, Ohio.
Pittsburgh Metallurgical Co., Inc., Niagara Falls, N. Y.
Vanadium Corp. of America, 420 Lexington Ave., N. Y. C.
FERROSILICON
Electro Metallurgical Sales Corp., 30 E. 42nd St., N. Y. C.
Ohio Ferro-Alloys Corp., Canton, Ohio.
Pittsburgh Metallurgical Co., Inc., Niagara Falls, N. Y.
Samuel, Frank & Co., Inc., Philadelphia.
Vanadium Corp. of America, 420 Lexington Ave., N. Y. C.
FERROSILICON ALUMINUM
Vanadium Corp. of America, 420 Lexington Ave., N. Y. C.
FERROSPIEGELEISEN
New Jersey Zinc Co., The, 160 Front St., N. Y. C.
FERROTITANIUM
Titanium Alloys Mfg. Co., The, Niagara Falls, N. Y.
Vanadium Corp. of America, 420 Lexington Ave., N. Y. C.
FERROVANADIUM
Electro Metallurgical Sales Corp., 30 E. 42nd St., N. Y. C.
Vanadium Corp. of America, 420 Lexington Ave., N. Y. C.
FILES & RASPS
Dixon, Henry & Sons, Inc., Philadelphia.
Nicholson File Co., Providence, R. I.
FILING MACHINES
Continental Machine Specialties, Inc., Minneapolis, Minn.
FILTER CLOTH—Asbestos
Johns-Manville Corp., 22 East 40th St., New York City.
FILTERS—Air
American Air Filter Co., Inc., Louisville, Ky.
FILTERS—OIL
National Acme Co., The, Cleveland.
FILTERS—Pressure or Gravity
Seale, Wm. B., & Sons Co., Pittsburgh.
FIRE BRICK—Insulating
Babcock & Wilcox Co., The, 85 Liberty St., New York City.
Quigley Co., Inc., 56 West 45th St., N. Y. C.
FIRE CLAY
Carborundum Co., The, Perth Amboy, N. J.
Illinoian Products Co., Joliet, Ill.
Koester Brick Co., Steubenville, Ohio.
West Virginia Fire Clay Mfg. Co., Pittsburgh.
FITTINGS—Brass, Pipe and Tube
Commonwealth Brass Corp., Detroit.
FIXTURES—For Machine Tools
Knu-Vise Products Co., Detroit, Mich.
FLANGES—Forged Steel
Harrisburg (Pa.) Steel Corp.
Standard Steel Wks. Co., Burnham, Pa.
FLANGING WORK—Carbon and Alloy
Worth Steel Co., Claymont, Del.
FLEXIBLE SHAFT EQUIPMENT
Lovejoy Flexible Coupling Co., Chicago.
Strand, N. A., & Co., Chicago.
FLOODLIGHTS—Acetylene
Linde Air Products Company, The, 30 East 42nd St., N. Y. C.
FLOOR ARMORING
Acme Steel Co., Chicago, Ill.
FLOOR (CONCRETE) REPAIR MATERIALS
Flexrock Co., 892 N. Delaware Ave., Phila., Pa.
FLOOR PLATES—See Plates—Floor or Cellar Door
Nukem Products Corp., 68 Niagara St., Buffalo, N. Y.
FLOORING—Monolithic
Johns-Manville Corp., 22 East 40th St., New York City.
FLOORING—Open Steel
Black Knob Co., Pittsburgh.
Hendrick Mfg. Co., Carbondale, Pa.
FLOORING—Steel
American Pressed Steel Co., Phila., Pa.

FLUX—Welding
Linde Air Products Company, The, 30 East 42nd St., N. Y. C.
FORGING MACHINES—Roll
Ajax Mfg. Co., The, Euclid, Ohio.
FORGING MACHINES—Upset
Acme Machinery Co., Cleveland.
Ajax Mfg. Co., The, Euclid, Ohio.
FORGINGS—Alloy Steel
National Forge & Ordnance Co., Irvine, Pa.
FORGINGS—Aluminum
Aluminum Co. of America, Pittsburgh.
FORGINGS—Brass, Bronze or Copper
American Brass Co., The, Waterbury, Conn.
Commonwealth Brass Corp., Detroit.
Revere Copper & Brass, Inc., 230 Park Ave., N. Y. C.
Transus & Williams Steel Forging Corp., Alliance, Ohio.
FORGINGS—Coin Pressed
Rockford (Ill.) Drop Forge Co.
FORGINGS—Drop, Iron or Steel
Atlas Drop Forge Co., Lansing, Mich.
Bay City Forge Co., Erie, Pa.
Billings & Spencer Co., Hartford, Conn.
Canton (Ohio) Drop Forging & Mfg. Co., Carnegie-Illinois Steel Corp. (U. S. Steel Corp. Subsidiary), Pittsburgh & Chicago.
Forging & Casting Corp., The, Ferndale, Mich.
Poor & Co., Canton Forge & Axle Wks., Canton, Ohio.
Rockford (Ill.) Drop Forge Co.
Storms Drop Forging Co., Springfield, Mass.
Transus & Williams Steel Forging Corp., Alliance, Ohio.
Williams, J. H., & Co., Buffalo, N. Y.
FORGINGS—Hollow
Harrisburg (Pa.) Steel Corp.
National Forge & Ordnance Co., Irvine, Pa.
FORGINGS—Hollow Bored
American Hollow Boring Co., 1912 Raspberry St., Erie, Pa.
FORGINGS—Hydraulic Press, Iron or Steel
Atlas Drop Forge Co., Lansing, Mich.
Bethlehem (Pa.) Steel Company.
Mesta Mfg. Co., Pittsburgh.
Midvale Co., The, Nicetown, Phila., Pa.
National Forge & Ordnance Co., Irvine, Pa.
Standard Steel Wks. Co., Burnham, Pa.
FORGINGS—Magnesium Alloys
Dow Chemical Co., The, 921 Jefferson Ave., Midland, Mich.
FORGINGS—Upset
Bethlehem (Pa.) Steel Company.
Lamson & Sessions Co., The, Cleveland.
Rockford (Ill.) Drop Forge Co.
FORMING AND COILING MACHINES
Peck, Stow & Wilcox Co., The, Southington, Conn.
FOUNDRY EQUIPMENT & SUPPLIES
Whiting Corp., Harvey, Ill.
FURNACE ENGINEERS
Electric Furnace Co., The, Salem, Ohio.
Flint & Drefelin Co., Chicago.
Surface Combustion Corp., 2375 Dorr St., Toledo.
Wilson, Lee Engineering Co., The, Cleveland.
FURNACES—Annealing & Case Hardening
American Gas Furnace Co., Elizabeth, N. J.
Electric Furnace Co., The, Salem, Ohio.
Leeds & Northrup Co., Philadelphia.
Surface Combustion Corp., 2375 Dorr St., Toledo.
Wilson, Lee Engineering Co., The, Cleveland.
FURNACES—Billet or Ingot Heating
Flint & Drefelin Co., Chicago.
Surface Combustion Corp., 2375 Dorr St., Toledo.
FURNACES—Brass Melting
Monarch Engineering & Mfg. Co., The, Baltimore, Md.
FURNACES—Electric, Steel Melting
American Bridge Co. (U. S. Steel Corp. Subsidiary), Pittsburgh.
General Electric Co., Schenectady, N. Y.
Pittsburgh (Pa.) Lectromelt Furnace Corp.
FURNACES—Enameling
Carborundum Co., The, Perth Amboy, N. J.
Electric Furnace Co., The, Salem, Ohio.
Surface Combustion Corp., 2375 Dorr St., Toledo.
FURNACES—Forging
Electric Furnace Co., The, Salem, Ohio.
Holcroft & Co., Detroit.
Surface Combustion Corp., 2375 Dorr St., Toledo.
Wilson, Lee Engineering Co., The, Cleveland.
FURNACES—Heat Treating, Automatic
Amer. Gas Furnace Co., Elizabeth, N. J.
Electric Furnace Co., The, Salem, Ohio.
Holcroft & Co., Detroit.
Leeds & Northrup Co., Philadelphia.
Rockwell, W. S., Co., 50 Church St., N. Y. C.
Surface Combustion Corp., 2375 Dorr St., Toledo.
FURNACES—Heat Treating, Cyanide
Chicago (Ill.) Flexible Shaft Co.
Electric Furnace Co., The, Salem, Ohio.
Surface Combustion Corp., 2375 Dorr St., Toledo.
FURNACES—Heat Treating, Electric
Electric Furnace Co., The, Salem, Ohio.
General Electric Co., Schenectady, N. Y.
Holcroft & Co., Detroit.

GRAMMES SERVICES INCLUDE:

| | | |
|--------------|--------------|-----------|
| ETCHING | LITHOGRAPHY | EMBOSSING |
| HARD ENAMEL | | |
| MET-A-LABELS |  |  | FINISHING |
| STAMPINGS | MACHINERY | |
| WIRE FORMING | ASSEMBLING | |
| | TOOLS & DIES | |

L. F. GRAMMES & SONS, INC.
MANUFACTURERS—ESTABLISHED 1875
ALLENTOWN, PENNSYLVANIA

STAMPED METAL PARTS



for every industry

We have had many years of Light and Heavy Stamping Experience. We offer you the benefit of our knowledge and equipment.

WORCESTER STAMPED METAL CO.

Established 1883

WORCESTER, MASS.

Hayward Buckets



A bucket for every digging and rehandling need... A size for every job.

THE HAYWARD CO., 46-50 Church St., N. Y.

ELEVATORS

Steam
Hydraulic
The Ridgway Steam Hydraulic Elevator is PERFECTION for the man who has steam or air available.

Hundreds in use in Biggest Plants

"HOOK 'ER TO THE BILER!"

CRAIG RIDGWAY & SON CO., COATESVILLE, PA.

CRANES

All Types
Foundry Equipment
Special Machinery
Evaporation
Chemical Machinery
Pulverized Coal
Equipment
Stokers

WHITING CORPORATION

HARVEY-ILL. U.S.A.

CHICAGO SUBURB

FAIRMOUNT FOUNDRY, INC.

Grey Iron, Semi-Steel, Aluminum
and Heat-Resisting Castings
Equipped with Moulding Machines

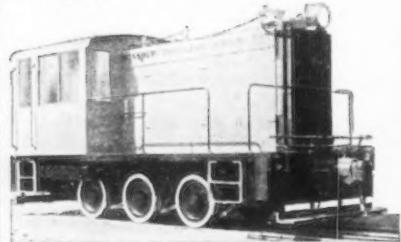
Main Office:
Third & Westmoreland Sts., Philadelphia, Pa.
Plants:
Philadelphia & Hamburg, Pa.

SAVING COSTS The Davenport Way"

are three dimensions in a locomotive's value is measured.

(1) Cost per ton-mile, (2) Earnings from Repairs and Maintenance expense, (3) Length of dependable service life.

By these tests of value Davenport locomotives are outstanding. Their increasing prestige based upon actual performance records all over the world are your assurance that Davenports can cut your haulage costs too.



PLANT AND MAIN OFFICE—DAVENPORT, IOWA
New York and Export Office—30 Church St.
Cable Address "Brosites"



DAVENPORT, IOWA, U.S.A.
A DIVISION OF THE DAVENPORT-BESLER CORPORATION

WRITE TODAY

This Book
Points the
Way to Loco-
motive Econ-
omy.

Submit your
haulage problems
to our engineers
for recommendations. This will
not obligate you
at all. It may
show you substantial
operating savings.



Products Index

Hoskins Mfg. Co., Detroit, Mich.
Leeds & Northrup Co., Philadelphia.
Maehtler, Paul Co., The, Chicago.
Rockwell, W. S., Co., 50 Church St., N.Y.C.
Westinghouse Electric & Mfg. Co., East
Pittsburgh, Pa.

FURNACES—Heat Treating, Oil or Gas
Chicago (Ill.) Flexible Shaft Co.
Electric Furnace Co., The, Salem, Ohio.
Holcroft & Co., Detroit.
Maehtler, Paul Co., The, Chicago.
Monarch Engineering & Mfg. Co., The,
Baltimore, Md.
Rockwell, W. S., Co., 50 Church St., N.Y.C.
Surface Combustion Corp., 2375 Dorr St.,
Toledo.
Wilson, Lee Engineering Co., The, Cleve-
land.

FURNACES—Pack Heating Sheets
Actna-Standard Engineering Co., The
Youngstown, Ohio.
Wean Engineering Co., Inc., The, Warren,
Ohio.

FURNACES—Rivet Heating, Electric
General Electric Co., Schenectady, N. Y.

**FURNACES—Wire, Annealing and Gal-
vanizing**
General Electric Co., Schenectady, N. Y.
Surface Combustion Corp., 2375 Dorr St.,
Toledo.

GAGE BLOCKS
Ford Motor Co. (Johansson Division),
Dearborn, Mich.
Pratt & Whitney Div. Niles-Bement-Pond
Co., Hartford, Conn.

GAGES—Dial
Starrett, L. S. Co., Athol, Mass.

GAGES—Electric
Sheffield Gage Corp., Dayton, Ohio.

GAGES—Plug and Snap
Pratt & Whitney Div. Niles-Bement-Pond
Co., Hartford, Conn.
Sheffield Gage Corp., Dayton, Ohio.

GAGES—Pressure & Vacuum Recording
Brown Instrument Co., The, Philadelphia,
Pa.

GAGES—Temperature
Weston Electrical Instrument Corp., New-
ark, N. J.

GAGES—Thickness, for Rolling Mills
Haines Gauge Co., The, Phila., Pa.

GAGES—Thread Lead

Jones & Lamson Mfg. Co., Springfield, Vt.
Pratt & Whitney Div. Niles-Bement-Pond
Co., Hartford, Conn.
Sheffield Gage Corp., Dayton, Ohio.

GALVANIZING
Castle, Joseph P., & Bros., Phila.

GALVANIZING COMPOUNDS
Pennsylvania Salt Mfg. Co., Philadelphia,
Pa.

GALVANIZING PLANTS—For Sheets
Actna-Standard Engineering Co., The
Youngstown, Ohio.
Erie (Pa.) Foundry Co.

GAS ANALYSIS RECORDERS
Brown Instrument Co., The, Philadelphia,
Pa.

Leeds & Northrup Co., Philadelphia.

GAS FOR INDUSTRIAL USES
American Gas Association, 420 Lexington
Ave., N. Y. C.

GAS PRODUCERS

Elliott & Dretfeln Co., Chicago.
Koppers Co., Pittsburgh.
Moran Construction Co., Worcester, Mass.
Wood, R. D., & Co., Philadelphia.

GAS RECOVERY COKE OVENS
Koppers Co., Pittsburgh.

GASKETS—Asbestos, Metal or Rubber
Garlock Packing Co., The, Palmyra, N. Y.
Johns-Manville Corp., 22 East 40th St.,
New York City.

GASKETS—Rubber

Goodrich, B. F. Co., The, Akron, Ohio.

GEAR CUTTING

Earle Gear & Machine Co., Phila.
Farrel-Birmingham Co., Inc., Buffalo, N.Y.

Gleason Works, Rochester, N. Y.
James, D. O., Mfg. Co., Chicago.
Jones, W. A., Fdry. & Mch. Co., 4401
Roosevelt Rd., Chicago.

GEAR DRIVES—Herringbone

Jones, W. A., Fdry. & Mch. Co., 4401
Roosevelt Rd., Chicago.

GEAR PLANNING MACHINES

Farrel-Birmingham Co., Inc., Buffalo, N.Y.
Gleason Works, Rochester, N. Y.

GEARS—Heat Treated

Gleason Works, Rochester, N. Y.
James, D. O., Mfg. Co., Chicago.
Jones, W. A., Fdry. & Mch. Co., 4401
Roosevelt Rd., Chicago.

GEARS—Pebble

Boston Gear Wks., Inc., North Quincy,
Mass.

GEEARS—Herringbone

Farrel-Birmingham Co., Inc., Buffalo, N.Y.
Gleason Works, Rochester, N. Y.

**GEARING AND POLISHING MA-
CHINES**

Black & Decker Mfg. Co., The, Towson, Md.
Excel-Tool & Mch. Co., E. Et. Louis, Ill.
Norton Co., Worcester, Mass.

GRINDING MACHINES—Belt

Production Machine Co., Greenfield, Mass.

GRINDING MACHINES—Broach

Thompson Grinder Co., Springfield, Ohio.

GRINDING MACHINES—Centerless

Cincinnati (Ohio) Grinders Incorporated.

GRINDING MACHINES—Cutter &

Reamer

Cincinnati (Ohio) Milling Mch. Co., The

Gallmeyer & Livingston Co., Grand
Rapids, Mich.

Lamis Tool Co., Waynesboro, Pa.

GRINDING MACHINES—Cylinder

Heald Mch. Co., Worcester, Mass.

GRINDING MACHINES—Cylindrical

Brown & Sharpe Mfg. Co., Providence, R.I.

Cincinnati (Ohio) Grinders Incorporated.

Lamis Tool Co., Waynesboro, Pa.

GRINDING MACHINES—Die

Landis Mch. Co., Inc., Waynesboro, Pa.

GRINDING MACHINES—Drill

Gallmeyer & Livingston Co., Grand
Rapids, Mich.

THE OHIO LOCOMOTIVE CRANE CO.
BUCKSBUS, OHIO

LOCOMOTIVE CRANES
CRAWLER CRANES
SHOVELS

THE OHIO LOCOMOTIVE CRANE CO.
BUCKSBUS, OHIO

The Handiest Tool in the Shop!

That's what users say of the Canton Portable Crane. It relieves the larger cranes of the smaller jobs, and is always available where needed.

Equipped with load brake to prevent "drops."

Ask about our 30 day trial offer.

Also manufacturers of Alligator Shears and Industrial Turntables

CANTON FOUNDRY & MACHINE CO.
6400 Breakwater Ave., Cleveland, Ohio

OVERHEAD CRANES • ELECTRIC HOISTS
CRAWLER CRANES • ELECTRIC MOTORS
ARC WELDERS • WELDING ELECTRODES

WRITE FOR LITERATURE ON PAH PRODUCTS—4461 W. NATIONAL AVE., MILWAUKEE, WIS.

HARNISCHFEGER
CORPORATION

HOISTS • WELDING ELECTRODES • MOTORS • EXCAVATORS • ELECTRIC CRANES • ARC WELDERS

CONCO CRANES
BUILDERS FOR 20 YEARS—ALL TYPES.
IN CAPACITIES TO 20 TONS—HOISTS—TROLLEYS

CONCO ENGINEERING WORKS
DIVISION OF H. D. CONKEY & COMPANY
405 CARLSON AVE. • MENDOTA, ILL.

Products Index

GRINDING MACHINES—Gear & Worm. Pratt & Whitney Div. Niles-Bement-Pond Co., Hartford, Conn.

GRINDING MACHINES—Internal. Greenfield (Mass.) Tap & Die Corp. Head Mch. Co., Worcester, Mass.

GRINDING MACHINES—Internal Centerless. Head Mch. Co., Worcester, Mass.

GRINDING MACHINES—Internal Multiple Spindle. Baird Mch. Co., The, Bridgeport, Conn.

GRINDING MACHINES—Portable Electric. Black & Decker Mfg. Co., The, Towson, Md. Wodack Electrical Tool Corp., Chicago.

GRINDING MACHINES—Portable Flexible Shaft. Pratt & Whitney Div. Niles-Bement-Pond Co., Hartford, Conn. Strand, N. A., & Co., Chicago.

GRINDING MACHINES—Portable Pneumatic. Cleveland (Ohio) Pneumatic Tool Co., The. Ingersoll-Rand Co., 11 Broadway, New York City.

Warner & Swasey Co., The, Cleveland.

GRINDING MACHINES—Roll. Cincinnati (Ohio) Grinders Incorporated. Farrel-Birmingham Co., Inc., Ansonia, Conn.

Landis Tool Co., Waynesboro, Pa.

GRINDING MACHINES—Snagging. Black & Decker Mfg. Co., The, Towson, Md. Warner & Swasey Co., The, Cleveland.

GRINDING MACHINES—Surface. Abrasive Machine Tool Co. E. Prov. R. I. Blanchard Machine Co., The, Cambridge, Mass.

Gallmeyer & Livingston Co., Grand Rapids, Mich. Head Mch. Co., Worcester, Mass.

Norton Co., Worcester, Mass. Pratt & Whitney Div. Niles-Bement-Pond Co., Hartford, Conn.

Thompson Grinder Co., Springfield, Ohio.

GRINDING MACHINES—Swing Frame. Black & Decker Mfg. Co., The, Towson, Md.

GRINDING MACHINES—Tap. Gallmeyer & Livingston Co., Grand Rapids, Mich.

GRINDING MACHINES—Tool. Cincinnati (Ohio) Milling Mch. Co., The. Gibson Machine Co., Madison, Wis.

Landis Tool Co., Waynesboro, Pa.

LeBlond R. I. Mch. Tool Co., Cincinnati.

Norton Co., Worcester, Mass.

GRINDING MACHINES—Universal. Cincinnati (Ohio) Grinders Incorporated. Landis Tool Co., Waynesboro, Pa.

Norton Co., Worcester, Mass.

Thompson Grinder Co., Springfield, Ohio.

GRINDING MACHINES—Valve. Landis Tool Co., Waynesboro, Pa.

GRINDING WHEELS. Bakelite Corp., 247 Park Ave., N. Y. C.

Blanchard Machine Co., The, Cambridge, Mass.

Carbundrum Co., The, Niagara Falls, N. Y.

Macklin Co., Jackson, Mich.

Manhattan Rubber Mfg. Div. of Raybestos-Manhattan, Inc., The, 2 Townsend St., Passaic, N. J.

Norton Co., Worcester, Mass.

GRINDING WHEELS—Segment. Blanchard Machine Co., The, Cambridge, Mass.

GRI—Steel. Pittsburgh (Pa.) Crushed Steel Co.

HACK SAW BLADES—See Saws—Hack Saws.

HACK SAW MACHINES. Armstrong-Blunt Mfg. Co., Chicago.

Peerless Mch. Co., Racine, Wis.

HAMMER BOARDS. Irwin, H. G., Lumber Co., 1129 State St., Erie, Pa.

HAMMERS—Air, Forging. Nazel Engineering & Machine Works, Philadelphia.

HAMMERS—Chipping & Riveting—Pneumatic. Cleveland (Ohio) Pneumatic Tool Co., The. Ingersoll-Rand Co., 11 Broadway, New York City.

HAMMERS—Drop. Billings & Spencer Co., Hartford, Conn.

Chambersburg (Pa.) Engineering Co.

Erie (Pa.) Foundry Co.

Morgan Engineering Co., The, Alliance, O.

Standard Machinery Co., Providence, R. I.

HAMMERS—Helve. Bradley, C. C., & Son, Inc., Syracuse, N. Y.

HAMMERS—Pneumatic. Cleveland (Ohio) Pneumatic Tool Co., The. Ingersoll-Rand Co., 11 Broadway, New York City.

HAMMERS—Portable Electric. Black & Decker Mfg. Co., The, Towson, Md.

Wodack Electric Tool Corp., Chicago.

HAMMERS—Power. Bradley, C. C., & Son, Inc., Syracuse, N. Y.

Chambersburg (Pa.) Engineering Co.

HAMMERS—Rawhide. Chicago (Ill.) Rawhide Mfg. Co., 1306 Elson Ave.

HAMMERS—Steam. Chambersburg (Pa.) Engineering Co.

Erle (Pa.) Foundry Co.

Morgan Engineering Co., The, Alliance, O.

HANGERS—Ball Bearing. S. K. F. Industries, Inc., Front St. & Erie Ave., Pitts., Pa.

HANGERS—Roller Bearing. Hyatt Bearings Div., General Motors Corp., Newark, N. J.

MARIS BROTHERS INC.

G. A. WHITEHEAD, OWNER
56th and GRAYS AVE.
PHILADELPHIA,
PA.

CRANES-HOISTS

**HAND
ELECTRIC**

ROBBINS & MYERS INC.
SPRINGFIELD, OHIO
ELECTRIC and HAND HOISTS—CRANES

DETROIT HOIST
ELECTRIC and PNEUMATIC CAPACITIES $\frac{1}{4}$ to 10 TONS
DETROIT HOIST & MACHINE CO.

EARLE GEARS
Cut Spur, Bevel, Herringbone and Worm Gears
All Sizes. Every Description Operating Machinery for Bridges, etc.
"Less Simplex" Cold Metal Gears.
The Earle Gear & Machine Co.
4715 Stanton Ave.
Philadelphia, Pa.
110 State St., Boston, Mass.
25 Liberty St., New York City

Need GEARS?
MAXIMUM SIZES
Spur Gears 145" Dia.
Bevel & Mitre Gears 60" Dia.
Worm Gears 72" Dia.
Worms 12" Dia.
Racks { 10" Face, 1 D.P.
9" Face, 9" Face, 1 D.P.
3 1/2 C.P., 3 1/2 C.P.
Internal Gears 30" Dia., 4 D.P.
MATERIALS
Cast Iron
Cast Steel
Forged Steel
Non-Ferrous Metals
Rawhide
Bakelite
All-Steel Silent Pinions
SEE SIMONDS
SIMONDS
HEAT TREATED GEARS FOR SEVERE SERVICE

THE SIMONDS MANUFACTURING CO., PITTSBURGH, PA.

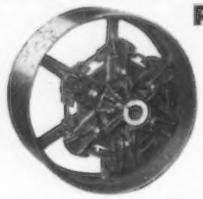
Exclusive Territories
A Size of Gears
For Every Purpose
GEAR & GEAR TYPE
FLexible Couplings
Available for
Qualified Sales Agents
GEAR & GEAR TYPE
FLexible Couplings
Shenango Furnace Co., Pittsburgh.
Shea, P. M. & Co., Pittsburgh.
Snyder, W. P. & Co., Pittsburgh.
Valley Mould & Iron Corp., Hubbard, Ohio.

FALLS FRICTION CLUTCH

Pulleys and Cut-Off Couplings

And a complete line of Power Transmission Machinery • Pillow Blocks • Hangers • Couplings • Pulleys • Sheaves • Send specifications for quotation.

THE FALLS CLUTCH & MACHINERY CO.
115 Portage St., CUYAHOGA FALLS, OHIO
NEW YORK, N. Y. 75 Warren Street BOSTON, MASS. 31 Wormwood Street



H. A. BRASSET & CO.
CONSULTING ENGINEERS
for Iron, Steel,
Fuel and Heavy Metallurgical Industries.
PROJECTS, PLANT DESIGN
CONSTRUCTION, OPERATION
MARKETS, FINANCE
AND MANAGEMENT
310 South Michigan Ave. Chicago, Ill.

INDUSTRIAL HEATING ENGINEERS

DESIGNING CONSULTING CONTRACTING
Guaranteed results on recommendations for new or improved equipment--processes--methods for any heating problem.

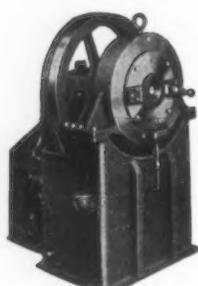
FLINN AND DREFFEIN CO.
308 W. Washington St. Chicago, Ill.

BELMONT IRON WORKS

Engineers-Contractors-Exporters
STRUCTURAL STEEL-BUILDINGS AND BRIDGES
RIVETED-ARC WELDED
BELMONT INTERLOCKING CHANNEL FLOOR

Write for Catalogue
Main Office: Phila., Pa. New York Office: 44 Whitehall St.

WIRE AND METAL RIBBON FORMING MACHINERY
NILSON TILTING
WIRE REELS
(Wire Reel Catalog No. 51)
Special Machines Designed and Built to Order
THE A. H. NILSON MACHINE COMPANY, BRIDGEPORT, CONN.



THE TORRINGTON SWAGING MACHINE

—with 4000 forceful squeezing hammer blows per minute—makes metal tougher and more elastic. Send for booklet—"The Modern Art of Swaging."

THE TORRINGTON CO., Standard Plant
55 Field Street Torrington, Conn., U. S. A.

Products Index

INGOTS—Aluminum

Aluminum Co. of America, Pittsburgh. Seligman, Arthur, & Co., Inc., 30 Rockefeller Plaza, B. C. A. Bldg., N. Y. C.

INGOTS—Phosphor Bronze

Phosphor Bronze Smelting Co., The, Phila. INHIBITORS American Chemical Paint Co., Ambler, Pa. Du Pont de Nemours, E. I., & Co., Inc. Grasselli Chemicals Dept., Wilmington, Del.

INSTRUMENTS—Electric

Weston Electrical Instrument Corp., Newark, N. J.

INSTRUMENTS—Recording

Brown Instrument Co., The, Philadelphia, Pa. Leeds & Northrup Co., Philadelphia.

INSULATION

Johns-Manville Corp., 22 East 40th St., New York City.

IRON—Rustless

Ludlum Steel Co., Watervliet, N. Y.

JIGS, FIXTURES, DIES, etc. (See Dies, Jigs, Fixtures, etc.)

KEYS—Riveted

Western Wire Prods. Co., St. Louis, Mo.

KEYSEATING MACHINES

Baker Bros., Inc., Toledo, Ohio. Davis Keyseater Co., 400 Exchange St., Rochester, N. Y.

LACING—Belt, Rawhide or Leather

Chicago (Ill.) Rawhide Mfg. Co., The, 1306 Elston Ave.

LAGGING—Insulating

Quigley Co., Inc., 36 West 45th St., N. Y. C.

LAMPS—Filament

General Electric Co., Cleveland.

LAMPS—Mercury Vapor

General Electric Vapor Lamp Co., Hoboken, N. J.

LAPPING MACHINES

Cincinnati (Ohio) Grinders Incorporated.

LATHES—Automatic

Baird Mch. Co., The, Bridgeport, Conn.

Bullard Co., The, Bridgeport, Conn.

Gisholt Machine Co., Madison, Wis.

Goss & De Leeuw Mch. Co., New Britain, Conn.

Jones & Lamson Mch. Co., Springfield, Vt.

LeBlond, R. K. Mch. Tool Co., Cincinnati.

Monarch Mch. Tool Co., The, Sidney, O.

LATHES—Crankshaft

LeBlond, R. K. Mch. Tool Co., Cincinnati.

LATHES—Contour Turning

Monarch Mch. Tool Co., The, Sidney, O.

LATHES—Crankshaft

LeBlond, R. K. Mch. Tool Co., Cincinnati.

LATHES—Crankshaft

Hill-Clarke Mchry. Co., 647 W. Washington Blvd., Chicago.

LeBlond, R. K. Mch. Tool Co., Cincinnati.

Monarch Mch. Tool Co., The, Sidney, O.

Pratt & Whitney Div. Niles-Bement-Pond Co., Hartford, Conn.

South Bend (Ind.) Lathe Works, 595 East Madison St.

LATHES—Roll

Baldwin & Mch. Co., Pittsburgh.

Mesta Mch. Co., Pittsburgh.

United Engineering & Fdry. Co., Pgh.

LATHES—Second-Hand. (See Clearing House Section)

LATHES—Toolroom

LeBlond, R. K. Machine Tool Co., Cincinnati, Ohio.

Monarch Mch. Tool Co., The, Sidney, O.

Pratt & Whitney Div. Niles-Bement-Pond Co., Hartford, Conn.

South Bend (Ind.) Lathe Works, 595 East Madison St.

LATHES—Turret

Acme Machine Tool Co., Cincinnati.

Baldwin & Oliver, Cleveland.

Bullard Co., The, Bridgeport, Conn.

Gisholt Machine Co., Madison, Wis.

Jones & Lamson Mch. Co., Springfield, Vt.

Warner & Swasey Co., The, Cleveland.

LATHES—Turret, Vertical

Bullard Co., The, Bridgeport, Conn.

Gisholt Machine Wks., Alfred, New York.

LAYOUT FLUID

Dayton Rogers Mfg. Co., Minneapolis, Minn.

LEAD LININGS

Dietzel Lead Burning Co., Pittsburgh.

National Lead Co., 111 Bdwy., N. Y. C.

LEAD—In Oil

National Lead Co., 111 Bdwy., N. Y. C.

LEAD—Tellurium

National Lead Co., 111 Bdwy., N. Y. C.

LEATHER—Cup

Chicago (Ill.) Rawhide Mfg. Co., The,

1306 Elston Ave.

LEGGINS—Safety

Safety Equipment Service Co., Cleveland.

LEVELING MACHINES

Atma-Standard Engineering Co., The,

Youngstown, Ohio.

Schatz Mfg. Co., The, Poughkeepsie, N. Y.

Wean Engineering Co., Inc., The, Warren, O.

LINING—Converter

Edge Hill Silica Rock Co., New Brunswick, New Jersey.

LOCK WASHER MACHINERY

Sleeper & Hartley, Inc., Worcester, Mass.

LOCOMOTIVES—Electric

Atlas Car & Mfg. Co., The, Cleveland.

Davenport (Iowa) Locomotives Works.

General Electric Co., Schenectady, N. Y.

LOCOMOTIVES—Gas-Electric

Davenport (Iowa) Locomotives Works.

LOCOMOTIVES—Industrial

Davenport (Iowa) Locomotives Works.

LOCOMOTIVES—Steam

Iron & Steel Products, Inc., Chicago.

LOCOMOTIVES—Storage Battery

Atlas Car & Mfg. Co., The, Cleveland.

LUBRICANTS—Crusher & Grinding

Gulf Oil Corp., Gulf Refining Co., Pittsburgh.

Shell's Industrial Lubricants Div., Shell Bldg., San Francisco, Shell Bldg., St. Louis, & 50 W. 50th St., N. Y. C.

Soco-Vacuum Oil Co., Inc., 26 Broadway, N. Y. C.

Sun Oil Co., Philadelphia.

Texas Company, The, 135 East 42nd St., N. Y. C.

LUBRICANTS—Gear

Gulf Oil Corp., Gulf Refining Co., Pittsburgh.

Shell's Industrial Lubricants Div., Shell Bldg., San Francisco, Shell Bldg., St. Louis, & 50 W. 50th St., N. Y. C.

Soco-Vacuum Oil Co., Inc., 26 Broadway, N. Y. C.

Sun Oil Co., Philadelphia.

Texas Company, The, 135 East 42nd St., N. Y. C.

LUBRICANTS—High Pressure &

Gulf Oil Corp., Gulf Refining Co., Pittsburgh.

Shell's Industrial Lubricants Div., Shell Bldg., San Francisco, Shell Bldg., St. Louis, & 50 W. 50th St., N. Y. C.

Soco-Vacuum Oil Co., Inc., 26 Broadway, N. Y. C.

Standard Oil Co., (Indiana), Chicago.

Sun Oil Co., Philadelphia.

Texas Company, The, 135 East 42nd St., N. Y. C.

LUBRICANTS—Mine Cars

Gulf Oil Corp., Gulf Refining Co., Pittsburgh.

Shell's Industrial Lubricants Div., Shell Bldg., San Francisco, Shell Bldg., St. Louis, & 50 W. 50th St., N. Y. C.

Soco-Vacuum Oil Co., Inc., 26 Broadway, N. Y. C.

Standard Oil Co., (Indiana), Chicago.

Sun Oil Co., Philadelphia.

Texas Company, The, 135 East 42nd St., N. Y. C.

LUBRICANTS—Mine Machines

Gulf Oil Corp., Gulf Refining Co., Pittsburgh.

Shell's Industrial Lubricants Div., Shell Bldg., San Francisco, Shell Bldg., St. Louis, & 50 W. 50th St., N. Y. C.

Soco-Vacuum Oil Co., Inc., 26 Broadway, N. Y. C.

Standard Oil Co., (Indiana), Chicago.

Sun Oil Co., Philadelphia.

Texas Company, The, 135 East 42nd St., N. Y. C.

LUBRICANTS—Railroad

Gulf Oil Corp., Gulf Refining Co., Pittsburgh.

Shell's Industrial Lubricants Div., Shell Bldg., San Francisco, Shell Bldg., St. Louis, & 50 W. 50th St., N. Y. C.

Soco-Vacuum Oil Co., Inc., 26 Broadway, N. Y. C.

Standard Oil Co., (Indiana), Chicago.

Sun Oil Co., Philadelphia.

Texas Company, The, 135 East 42nd St., N. Y. C.

LUBRICANTS—Roll Neck—Anti-Friction & Plain

Gulf Oil Corp., Gulf Refining Co., Pittsburgh.

Shell's Industrial Lubricants Div., Shell Bldg., San Francisco, Shell Bldg., St. Louis, & 50 W. 50th St., N. Y. C.

Soco-Vacuum Oil Co., Inc., 26 Broadway, N. Y. C.

Standard Oil Co., (Indiana), Chicago.

Sun Oil Co., Philadelphia.

Texas Company, The, 135 East 42nd St., N. Y. C.

LUBRICANTS—Tipple & Cleaning

Gulf Oil Corp., Gulf Refining Co., Pittsburgh.

Shell's Industrial Lubricants Div., Shell Bldg., San Francisco, Shell Bldg., St. Louis, & 50 W. 50th St., N. Y. C.

Soco-Vacuum Oil Co., Inc., 26 Broadway, N. Y. C.

Standard Oil Co., (Indiana), Chicago.

Sun Oil Co., Philadelphia.

Texas Company, The, 135 East 42nd St., N. Y. C.

LUBRICANTS—Tungsten

Gulf Oil Corp., Gulf Refining Co., Pittsburgh.

Shell's Industrial Lubricants Div., Shell Bldg., San Francisco, Shell Bldg., St. Louis, & 50 W. 50th St., N. Y. C.

Soco-Vacuum Oil Co., Inc., 26 Broadway, N. Y. C.

Standard Oil Co., (Indiana), Chicago.

Sun Oil Co., Philadelphia.

Texas Company, The, 135 East 42nd St., N. Y. C.

LUBRICANTS—Tungsten

Gulf Oil Corp., Gulf Refining Co., Pittsburgh.

Shell's Industrial Lubricants Div., Shell Bldg., San Francisco, Shell Bldg., St. Louis, & 50 W. 50th St., N. Y. C.

Soco-Vacuum Oil Co., Inc., 26 Broadway, N. Y. C.

Standard Oil Co., (Indiana), Chicago.

Sun Oil Co., Philadelphia.

Texas Company, The, 135 East 42nd St., N. Y. C.

LUBRICANTS—Tungsten

Gulf Oil Corp., Gulf Refining Co., Pittsburgh.

Shell's Industrial Lubricants Div., Shell Bldg., San Francisco, Shell Bldg., St. Louis, & 50 W. 50th St., N. Y. C.

Soco-Vacuum Oil Co., Inc., 26 Broadway, N. Y. C.

Standard Oil Co., (Indiana), Chicago.

Sun Oil Co., Philadelphia.

Texas Company, The, 135 East 42nd St., N. Y. C.

LUBRICANTS—Tungsten

Gulf Oil Corp., Gulf Refining Co., Pittsburgh.

Shell's Industrial Lubricants Div., Shell Bldg., San Francisco, Shell Bldg., St. Louis, & 50 W. 50th St., N. Y. C.

Soco-Vacuum Oil Co., Inc., 26 Broadway, N. Y. C.

Standard Oil Co., (Indiana), Chicago.

Sun Oil Co., Philadelphia.

Texas Company, The, 135 East 42nd St., N. Y. C.

LUBRICANTS—Tungsten

Gulf Oil Corp., Gulf Refining Co., Pittsburgh.

Shell's Industrial Lubricants Div., Shell Bldg., San Francisco, Shell Bldg., St. Louis, & 50 W. 50th St., N. Y. C.

Soco-Vacuum Oil Co., Inc., 26 Broadway, N. Y. C.

Standard Oil Co., (Indiana), Chicago.

Sun Oil Co., Philadelphia.

Texas Company, The, 135 East 42nd St., N. Y. C.

LUBRICANTS—Tungsten

Gulf Oil Corp., Gulf Refining Co., Pittsburgh.

Shell's Industrial Lubricants Div., Shell Bldg., San Francisco, Shell

Products Index

MACHINE GUARD MATERIALS

Erdie Perforating Co., Rochester, N. Y.

MACHINE WORK

General Machine Works, York, Pa.

Gifford-Wood Co., Hudson, N. Y.

Houde Engineering Corp., Buffalo, N. Y.

Taft-Pelre Mfg. Co., The, Woonsocket, R. I.

MACHINERY DEALERS—Second-Hand, (See Clearing House Section)

MACHINISTS' SMALL TOOLS

Brown & Sharpe Mfg. Co., Providence, R. I.

Starrett, L. S. Co., Athol, Mass.

MAGNESITE—Brick or Dead Burnt

Carborundum Co., The, Perth Amboy, N. J.

MAGNESIUM

Dow Chemical Co., The, 921 Jefferson Ave., Midland, Mich.

MAGNETS—Lifting

Cutter-Hammer, Inc., Milwaukee.

Electric Controller & Mfg. Co., The, Cleve.

Ohio Electric Mfg. Co., The, 5908 Mauric.

Ave., Cleveland.

MALLETS—Rawhide

Chicago (Ill.) Rawhide Mfg. Co., The, 1306 Elston Ave.

MANDRELS—Expanding

Nicholson, W. H. & Co., 165 Oregon St., Wilkes-Barre, Pa.

MANGANESE METAL AND ALLOYS

Electro Metallurgical Sales Corp., 30 East 42nd St., N. Y. C.

MANHOLE FITTINGS AND SADDLES

Worth Steel Co., Claymont, Del.

MANIFOLDS—Oxygen & Acetylene

Air Reduction Sales Co., 60 East 42nd

St., N. Y. C.

Linde Air Products Company, The, 30 East

42nd St., N. Y. C.

MARKING MACHINES

Noble & Westbrook Mfg. Co., The, East Hartford, Conn.

METAL SPECIALTIES

Crony Co., The, Buffalo, N. Y.

Grammes, L. F., & Sons, Inc., Allentown, Pa.

Toledo (Ohio) Stamping & Mfg. Co.

Torrington (Conn.) Company.

Truscon Steel Co., Pressed Steel Div., Cleveland.

Whitehead Stamping Co., 1669 W. Lafayette Blvd., Detroit, Mich.

Worcester (Mass.) Stamped Metal Co.

METAL—Thermostatic Bimetal

Chace, W. M., Co., 1605 Beard Ave., Detroit.

METALS—Coating

Metals Coating Co. of America, Phila., Pa.

METERS—Electric Welding

Lincoln Electric Co., The, Cleveland.

METERS—Flow

Brown Instrument Co., The, Philadelphia, Pa.

Leeds & Northrup Co., Philadelphia.

METERS—Water & Oil

Worthington Pump & Machinery Corp., Harrison, N. J.

MICA SCHIST

Edge Hill Silica Rock Co., New Brunswick, New Jersey.

MICROMETERS

Starrett, L. S. Co., Athol, Mass.

MICROMETERS—Automatic, for Rolling Mills

Haines Gauge Co., The, Phila., Pa.

MILLING MACHINES—Automatic

Cincinnati (Ohio) Milling Mch. Co., The.

MILLING MACHINES—Horizontal

Brown & Sharpe Mfg. Co., Prov., R. I.

Cincinnati (Ohio) Milling Mch. Co., The.

MILLING MACHINES—Planer Type

Cincinnati (Ohio) Planer Co.

MILLING MACHINES—Second-Hand, (See Clearing House Section)

MILLING MACHINES—Vertical

Brown & Sharpe Mfg. Co., Prov., R. I.

Cincinnati (Ohio) Milling Mch. Co., The.

MOLDING MACHINES

Tabor Mfg. Co., Phila., Pa.

MOLYBDENUM

U.S. Molybdenum Co., 500 Fifth Ave., N. Y. C.

MONEL METAL

International Nickel Co., Inc., The, 67 Wall St., N. Y. C.

MONORAIL SYSTEMS—Land & Electric

American Monorail Co., The, Cleveland.

Cleveland Tramrail Div. of The Cleveland Crane & Engng. Co., Wickliffe, Ohio.

MOTORS—Electric

Allis-Chalmers Mfg. Co., Milwaukee.

Century Electric Co., St. Louis, Mo.

Fairbanks, Morse & Co., Chicago.

General Electric Co., Schenectady, N. Y.

Harnischfeger Corp., 4401 W. National Ave., Milwaukee.

Lincoln Electric Co., Cleveland.

Reliance Electric & Engineering Co., Cleveland.

Westinghouse Elec. & Mfg. Co., E. Pitts.

MOTORS—Electric, Second-Hand, (See Clearing House Section)

MUFFLES—Alloy

Elkay Alloys Co., Elyria, Ohio.

NAILS—Wire

American Steel & Wire Co. (U. S. Steel Corp. Subsidiary), Chicago.

Columbia Steel Co. (U. S. Steel Corp. Subsidiary), San Francisco, Calif.

Hassall, John, Inc., Clay & Oakland Sts., Bklyn., N. Y.

Pittsburgh (Pa.) Steel Co.

Wickwire Brothers, Cortland, N. Y.

Youngstown (Ohio) Sheet & Tube Co., The.

NIBBLING MACHINES

Gray Machine Co., Philadelphia.

NICKEL

International Nickel Co., Inc., The, 67 Wall St., N. Y. C.

NICKEL ANODES—Reeled or Cast

Seymour (Conn.) Mfg. Co.

NICKEL SILVER

Seymour (Conn.) Mfg. Co.

NITROGEN

Air Reduction Sales Co., 60 East 42nd

St., N. Y. C.

NOZZLES—Sand Blasting

Norton Co., Worcester, Mass.

NUMBERING MACHINES—For Metal

Noble & Westbrook Mfg. Co., The, East Hartford, Ct.

NUT MACHINERY—Automatic Cold Pressed

Waterbury (Conn.) Farrel Foundry & Machine Co.

NUTS—Acorn

Republic Steel Corp., Upson Nut Div., Cleveland, O.

Russell, Burdsall & Ward Bolt & Nut Co., Port Chester, N. Y.

NUTS—Castellated

National Acme Co., The, Cleveland.

Republic Steel Corp., Upson Nut Div., Cleveland, O.

Russell, Burdsall & Ward Bolt & Nut Co., Port Chester, N. Y.

NUTS—Cold Pressed

Republic Steel Corp., Upson Nut Div., Cleveland, O.

Russell, Burdsall & Ward Bolt & Nut Co., Port Chester, N. Y.

NUTS—Hot Pressed

Republic Steel Corp., Upson Nut Div., Cleveland, O.

Russell, Burdsall & Ward Bolt & Nut Co., Port Chester, N. Y.

NUTS—Lock

Standard Pressed Steel Co., Jenkintown, Pa.

NUTS—Machine Screw

Blake & Johnson Co., The, Waterville, Ct.

NUTS—Semi-Finished

Cleveland (Ohio) Cap Screw Co., The.

Republic Steel Corp., Upson Nut Div., Cleveland, O.

Russell, Burdsall & Ward Bolt & Nut Co., Port Chester, N. Y.

NUTS—Thumb Malleable

Republic Steel Corp., Upson Nut Div., Cleveland, O.

Russell, Burdsall & Ward Bolt & Nut Co., Port Chester, N. Y.

OIL & GREASE SEALS

Chicago (Ill.) Rawhide Mfg. Co., The, 1306 Elston Ave.

OIL RETAINERS

Chicago (Ill.) Rawhide Mfg. Co., The, 1306 Elston Ave.

OIL STONES

Carborundum Co., The, Niagara Falls, N. Y.

Norton Co., Worcester, Mass.

OILS—Cutting

Shell's Industrial Lubricants Div., Shell Bldg., San Francisco, Shell Bldg., St. Louis, & 50 W. 50th St., N. Y. C.

Socony-Vacuum Oil Co., Inc., 26 Broadway, N. Y. C.

Standard Oil Co. (Indiana), Chicago, Ill.

Sun Oil Co., Philadelphia.

Tide Water Associated Oil Co., 17 Battery Place, N. Y. C.

OILS—Fuel

Gulf Oil Corp., Gulf Refining Co., Pittsburgh.

Socony-Vacuum Oil Co., Inc., 26 Broadway, N. Y. C.

Standard Oil Co. (Indiana), Chicago, Ill.

Sun Oil Co., Philadelphia.

Tide Water Associated Oil Co., 17 Battery Place, N. Y. C.

OILS—Lubricating

Gulf Oil Corp., Gulf Refining Co., Pittsburgh.

Shell's Industrial Lubricants Div., Shell Bldg., San Francisco, Shell Bldg., St. Louis, & 50 W. 50th St., N. Y. C.

Socony-Vacuum Oil Co., Inc., 26 Broadway, N. Y. C.

Standard Oil Co. (Indiana), Chicago, Ill.

Sun Oil Co., Philadelphia.

Tide Water Associated Oil Co., 17 Battery Place, N. Y. C.

OILS—Soluble—See Oils—Cutting

ORES—Iron

Cleveland Cliffs Iron Co., The, Cleveland, Ohio.

Hanna Furnace Corp., The, Detroit, Mich.

Pickands Mather & Co., Cleveland.

Shenango Furnace Co., Pittsburgh.

Snyder, W. P., & Co., Pittsburgh.

Standard Oil Co. (Indiana), Chicago, Ill.

Texas Company, The, 135 East 42nd St., N. Y. C.

Tide Water Associated Oil Co., 17 Battery Place, N. Y. C.

OVENS—Coke and By-Product Recovery

Koppers Co., Pittsburgh.

OVENS—Cone and Mold

Herrington & Randall, Inc., Detroit.

Holcroft & Co., Detroit.

McCreary Engineering & Mfg. Co., The, Baltimore, Md.

OVENS—Cross Regenerative

Koppers Co., Pittsburgh.

OVENS—Cross

Hassall, John, Inc., Clay & Oakland Sts., Bklyn., N. Y.

HENDRICK

will be glad to help you

D O you ever have an unusual problem requiring a special perforated metal? Hendrick has ample facilities to cooperate in developing the ideal design for you. » » » Fifty years of experience with perforated metals of every description are your assurance of intelligent cooperation and a practicable solution. » » » Write Hendrick, Carbondale.

HENDRICK MFG. CO.

37 Dundaff Street, Carbondale, Pa.

SALES OFFICES IN PRINCIPAL CITIES

PLEASE CONSULT TELEPHONE DIRECTORY

Manufacturers of Metal Open Steel Flooring; Elevator Buckets; Light and Heavy Steel Plate Construction

TIN, STEEL, COPPER, ALUMINUM, BRONZE, BRASS, ZINC, ANY METAL, ANY PURPOSE

CHARLES MUNDT & SONS

59 FAIRMOUNT AVE., JERSEY CITY, N. J.

Products Index

Products Index

OVENS—Enameling and Japanning
Carborundum Co., The, Perth Amboy, N. J.
Herrington & Randall, Inc., Detroit.
Machler, Paul Co., The, Chicago.
Surface Combustion Corp., 2375 Dorf St., Toledo.

OXY-ACETYLENE—Shape-Cutting Machines
Air Reduction Sales Co., 60 East 42nd St., N. Y. C.
Linde Air Products Company, The, 30 East 42nd St., N. Y. C.

OXYGEN
Air Reduction Sales Co., 60 East 42nd St., N. Y. C.
Linde Air Products Company, The, 30 East 42nd St., N. Y. C.

PACKING—Felt
American Felt Co., 315 Fourth Ave., N. Y. C.

PACKING—Hydraulic
Rhoads, J. E. & Sons, Philadelphia.

PACKING—Leather
Chicago (Ill.) Hawhicle Mfg. Co., The, 1300 Elston Ave.
Rhoads, J. E. & Sons, Philadelphia.

PACKING—Metallic
Garlock Packing Co., The, Palmyra, N. Y.
PACKING—Rubber
Goodrich, B. F., Co., The, Akron, Ohio.
Goodyear Tire & Rubber Co., Akron, Ohio.
Manhattan Rubber Mfg. Div. of Raybestos-Manhattan Inc., The, 2 Townsend St., Passaic, N. J.

PACKING—Sheet, Asbestos or Rubber
Garlock Packing Co., The, Palmyra, N. Y.
Johns-Manville Corp., 22 East 40th St., New York City.

PAINT
Midland Paint & Varnish Co., The, Cleveland.
National Lead Co., 111 Bdway., N. Y. C.

PAINT STICKS
Holmes & Staley, Inc., Chicago, Ill.

PERFORATED METAL

Chicago Perforating Co., 2440 W 24th Place, Chicago, Ill.
Diamond Mfg. Co., Wyoming, Pa.
Endicott Perforating Co., Rochester, N. Y.
Harrington & King Perforating Co., Chicago.
Hendrick Mfg. Co., Carbondale, Pa.
Munnell, Chas., & Sons, 59 Fairmount Ave., Jersey City, N. J.
Wilkshire Spencer Steel Co., 41 East 42nd St., N. Y. C.

PHOSPHOR—Copper
Phosphor Bronze Smelting Co., The, Phila.

PICKLING COMPOUNDS
American Chemical Paint Co., Ambler, Pa.

PICKLING MACHINES
Aetna-Standard Engineering Co., The, Youngstown, Ohio.

Mesta Mch. Co., Pittsburgh.

PICKLING TANK LININGS

Celico Co., The, Cleveland.
Keagler Brick Co., Steubenville, Ohio.
National Lead Co., 111 Bdway., N. Y. C.

PICKLING TANK STEAM JETS

Dietzel Lead Burning Co., Pittsburgh.

Durlon Co., Inc., The, 438 N. Findlay St., Dayton, Ohio.

PIG IRON

Bethlehem (Pa.) Steel Co.

Brooke, E. & G., Iron Co., Birdsboro, Pa.

Carnegie-Illinois Steel Corp., U. S. Steel Corp., Subsidiary), Pittsburgh & Chicago.

Cleveland-Cliffs Iron Co., The, Cleveland, Ohio.

Hanna Furnace Corp., The, Detroit, Mich.

Pickands Mather & Co., Cleveland.

Republic Steel Corp., Cleveland, Ohio.

Shenango Furnace Co., Pittsburgh.

Shenango-Penn Mold Co., Pittsburgh.

Sunder Charcoal Iron Co., Grand Rapids, Mich.

Tennessee Coal, Iron & Railroad Co., (U. S. Steel Corp., Subsidiary), Birmingham, Ala.

PIG IRON—Charcoal

Superior Charcoal Iron Co., Grand Rapids, Mich.

PILING—Steel Pipe

National Tube Co., (U. S. Steel Corp., Subsidiary), Pittsburgh.

PILING—Steel Sheet

Carnegie-Illinois Steel Corp., (U. S. Steel Corp., Subsidiary), Pittsburgh & Chicago.

Jones & Laughlin Steel Corp., Pittsburgh.

PINIONS—Rolling Mill

Mesta Mch. Co., Pittsburgh.

PINIONS—Wire and Rod

Rathbone, A. R. & J., Palmer, Mass.

PINS—Cotter

Lamson & Sessions Co., The, Cleveland.

PIPE—Acid Resisting

Havex Corporation, Newark, Delaware.

PIPE—Cast Iron, B. & S. and Flanged

Wood, R. D. & Co., Philadelphia.

PIPE—Hammer Welded

National Tube Co., (U. S. Steel Corp., Subsidiary), Pittsburgh.

PIPE—Lead

National Lead Co., 111 Bdway., N. Y. C.

PIPE—Lead Lined

National Lead Co., 111 Bdway., N. Y. C.

PIPE—New and Second-Hand

Albert & Davidson Pipe Corp., 2nd Ave., 50-51st St., Bklyn., N. Y. C.

Albert Pipe Supply Co., Inc., Berry and 13th St., Bklyn., N. Y. C.

Greenpoint Iron & Pipe Co., Inc., Stagg & Bogart Sts., Bklyn., N. Y.

PIPE—Seamless Brass or Copper
American Brass Co., The, Waterbury, Conn.
Revere Copper & Brass, Inc., 230 Park Ave., N. Y. C.

PIPE—Spiral Welded

American Rolling Mill Co., Middletown, O. Crane Co., Chicago.

PIPE—Standard, Black and Galvanized

Bethlehem (Pa.) Steel Co.

Jones & Laughlin Steel Corp., Pittsburgh.

National Tube Co., (U. S. Steel Corp., Subsidiary), Pittsburgh.

Republic Steel Corp., Cleveland, Ohio.

Youngstown (Ohio) Sheet & Tube Co., The.

PIPE—Welded, Electric

National Tube Co., (U. S. Steel Corp., Subsidiary), Pittsburgh.

Republic Steel Corp., Cleveland, Ohio.

Youngstown (Ohio) Sheet & Tube Co., The.

PIPE FITTINGS

Crane Co., Chicago.

Jarecki Mfg. Co., Erie, Pa.

PIPE THREADING & CUTTING MACHINES

Aetna-Standard Engineering Co., The, Youngstown, Ohio.

Jarecki Mfg. Co., Erie, Pa.

Lands, Mach. Co., Inc., Waynesboro, Pa.

Murchey Machine & Tool Co., Detroit.

Taylor-Wilson Mfg. Co., McKees Rocks, Pa.

PLANERS

Cincinnati (Ohio) Planer Co.

PLANING MACHINES—Second Hand (See Clearing House Section)

PLASTICS—Laminated

Bakelite Corp., 247 Park Ave., N. Y. C.

PLASTICS—Molded or Molded Phenolic

Richardson Co., The, Melrose Park, Ill.

PLASTICS—Molded

Bakelite Corp., 247 Park Ave., N. Y. C.

PLASTICS—Synthetic

Bakelite Corp., 247 Park Ave., N. Y. C.

PLATER'S CLEANING COMPOUND

American Chemical Paint Co., Ambler, Pa.

PLATES—Floor or Cellar Door

Alan Wood Steel Co., Conshohocken, Pa.

American Pressed Steel Co., Phila., Pa.

Corp. Subsidiary), Pittsburgh & Chicago.

Central Iron & Steel Co., Harrisburg, Pa.

Indialand Steel Co., Chicago.

Alan Wood Steel Co., Conshohocken, Pa.

American Pressed Steel Co., Phila., Pa.

Bethlehem (Pa.) Steel Company.

Carnegie-Illinois Steel Corp., (U. S. Steel Corp., Subsidiary), Pittsburgh & Chicago.

Central Iron & Steel Co., Harrisburg, Pa.

Granite City (Ill.) Steel Co.

Indialand Steel Co., Chicago.

Jones & Laughlin Steel Corp., Pittsburgh.

Ryerson & Sons, Chicago.

Tennessee Coal, Iron & Railroad Co., (U. S. Steel Corp., Subsidiary), Birmingham, Ala.

Worthington Pump & Machinery Corp., The.

PLATEFORM—Skid

Lewis-Sheridan Co., 122 Walnut St., Waterbury, Conn.

PLATES—Core Hole

Hubbard, M. D., Spring Co., 750 Central Ave., Pontiac, Mich.

POLISHING & BUFFING MACHINES—Automatic

Parker Machine Co., The, Meriden, Conn.

Continental Machine Specialties, Inc., Minneapolis, Minn.

Parker Machine Co., The, Meriden, Conn.

POLISHING MACHINES—Bar

Medart Co., The, St. Louis, Mo.

POLISHING MACHINES—Belt

Production Machine Co., Springfield, Mass.

POLES—Lead, Cyanide or Carbon

Electro-Alloys Co., Elvira, Ohio.

POWER UNITS—Rotary

Cushman Chuck Co., Hartford, Conn.

New Departure Div., General Motors Corp., Bristol, Conn.

POWER UNITS—Straight Line

Cushman Chuck Co., Hartford, Conn.

PRECIPITATORS—Electrostatic Dust

Panaborn Corporation, Hazlestown, Md.

PRESS FEEDS—Automatic

Littell, F. J., Mch. Co., Chicago.

PRESSED METAL PARTS

Champion Sheet Metal Co., Inc., cor.

Squires & Duane Sts., Cortland, N. Y.

Crosby Co., The, Buffalo, N. Y.

Stanley Works, The, New Britain, Conn.

Bridgeport, Conn.

Transue & Williams Steel Forging Corp., Alliance, O.

Whitehead Stamping Co., 1669 W. Lafayette Blvd., Detroit, Mich.

PRESSED STEEL PARTS

Crosby Co., The, Buffalo, N. Y.

Lansing, Mich., Stamping Co., 8 Penn Ave.

Parish Pressed Steel Co., Reading, Pa.

Trucom Steel Co., Pressed Steel Div., Cleveland, O.

PRESSES—Automatic

Henry & Wright Mfg. Co., The, Hartford, Conn.

Niagara Mch. & Tool Wks., Buffalo, N. Y.

V & O Press Co., Hudson, N. Y.

PRESSES—Automatic

Crane Co., Chicago.

Fairbanks, Morse & Co., Chicago.

Worthington Pump & Machinery Corp., Harrison, N. J.

PUMPS—Power

Fairbanks, Morse & Co., Chicago.

Worthington Pump & Machinery Corp., Harrison, N. J.

PUMPS—Rotary Positive, Centrifugal & Turbine

Crane Co., Chicago.

Fairbanks, Morse & Co., Chicago.

Worthington Pump & Machinery Corp., Harrison, N. J.

PUMPS—Rotary Positive, Centrifugal & Turbine

Crane Co., Chicago.

Fairbanks, Morse & Co., Chicago.

Worthington Pump & Machinery Corp., Harrison, N. J.

PUMPS—Steam

Fairbanks, Morse & Co., Chicago.

Ingersoll-Rand Co., (Cameron), 11 Broad-

way, N. Y. C.

PUMPS—Nickel Silver

American Brass Co., The, Waterbury, Conn.

Seymour (Conn.) Mfg. Co.

PUMPS—Phosphor Bronze

American Brass Co., The, Waterbury, Conn.

Revere Copper & Brass, Inc., 230 Park Ave., N. Y. C.

PUMPS—Magnesium Alloys

Dow Chemical Co., The, 921 Jefferson Ave., Midland, Mich.

PUMPS—Vacuum

Pennsylvania Pump & Compressor Co., Easton, Pa.

Worthington Pump & Machinery Corp., Harrison, N. J.

PUNCHES & Dies

Cleveland Steel Tool Co., The, 660 E. 82d St., Cleveland, Ohio.

PUNCHING AND SHEARING MACHINES

Beatty Mch. & Mfg. Co., 936—150th St., Hammond, Ind.

Berisch & Co., Cambridge City, Ind.

Cincinnati (Ohio) Shaper Co., The, Excelsior Tool & Mach. Co., E. St. Louis, Ill.

G. D. S. Machinery & Supply Co., Inc., 101 Walker St., N. Y. C.

Niagara Machine & Tools Works, Buffalo, N. Y.

Pels, Henry, & Co., Inc., 90 West St., N. Y. C.

Schaefer Mfg. Co., The, Poughkeepsie, N. Y.

Thomas Mch. Mfg. Co., Pittsburgh.

PYROMETERS—Indicating

Brown Instrument Co., The, Philadelphia, Pa.

Hoskins Mfg. Co., Detroit, Mich.

Leeds & Northrup Co., Philadelphia.

RAILS

Carrage-Illinois Steel Corp., (U. S. Steel Corp., Subsidiary), Pittsburgh & Chicago.

Foster, L. B., Co., Inc., Pittsburgh.

Frank, M. K., 480 Lexington Ave., N. Y. C.

Tennessee Coal, Iron & Railroad Co., (U. S. Steel Corp., Subsidiary), Birmingham, Ala.

RAILS—Relaying

Hyman-Michaels Co., Chicago.

Iron & Steel Products, Inc., Chicago.

Sherwood, E. C., 50 Church St., N. Y. C.

RAILWAY EQUIPMENT & SUPPLIES

Fairbanks, Morse & Co., Chicago.

Iron & Steel Products, Inc., Chicago.

Products Index

RODS—Rustless
Rustless Iron & Steel Corp., Baltimore, Md.

RODS—Welding
Air Reduction Sales Co., 60 East 42nd St., N. Y. C.

American Brass Co., The Waterbury, Conn.

American Steel & Wire Co. (U. S. Steel Corp. Subsidiary), Chicago.

Electric Arc Cutting & Welding Co., The Newark, N. J.

Harnischfeger Corp., 4401 W. National Ave., Milwaukee.

Lincoln Electric Co., The, Cleveland.

Linde Air Products Company, The, 30 East 42nd St., N. Y. C.

Pittsburgh (Pa.) Steel Co.

Revere Copper & Brass, Inc., 230 Park Ave., N. Y. C.

Una Welding Inc., Cleveland, Ohio.

Wilson Welder & Metals Co., Inc., 60 E. 42nd St., New York City.

RODS—Wire
American Steel & Wire Co. (U. S. Steel Corp. Subsidiary), Chicago.

Bethlehem (Pa.) Steel Co.

Jones & Laughlin Steel Corp., Pittsburgh.

Pittsburgh (Pa.) Steel Co.

Wickwire Brothers, Cortland, N. Y.

Wickwire Spencer Steel Co., 41 East 42nd St., N. Y. C.

Youngstown (Ohio) Sheet & Tube Co., The.

ROLLING MACHINERY—Cold Rolling
Cold Metal Process Co., The, Youngstown, Ohio.

Lewis Foundry & Mch. Co., Pittsburgh.

United Engineering & Fdry. Co., Pgh.

ROLLING MACHINERY—Sheet Metal
Lewis Foundry & Mch. Co., Pittsburgh.

ROLLING MILL MACHINERY
Aetna-Standard Engineering Co., The, Youngstown, Ohio.

Birdsboro (Pa.) Steel Foundry & Machine Co.

Cold Metal Process Co., The, Youngstown, Ohio.

Ford-Birmingham Co., Inc., Ansonia, Ct.

Hyde Park (Pa.) Fdry. & Mch. Co.

Lewis Foundry & Mch. Co., Pittsburgh.

Mesta Mch. Co., Pittsburgh.

Morgan Construction Co., Worcester, Mass.

Morgan Engineering Co., The, Alliance, O.

National Roll & Fdry. Co., Avonmore, Pa.

Standard Machinery Co., Providence, R. I.

United Engineering & Fdry. Co., Pgh.

Waterbury (Ct.) Farrel Fdry. & Mch. Co. The.

ROLLING MILLS—Copper Rod & Sheet
Torrington (Conn.) Mfg. Co., The.

ROLLS—Alloy Steel
Pittsburgh (Pa.) Rolls Corp.

ROLLS—Bending and Straightening
Baldwin-Southwark Corp., Southwark Div., Philadelphia.

Bertsch & Co., Cambridge City, Ind.

Lake Erie Engineering Corp., 68 Kenmore Sta., Buffalo, N. Y.

Niagara Machine & Tool Works, Buffalo, N. Y.

Schatz Mfg. Co., The, Poughkeepsie, N. Y.

ROLLS—Rubber Covered
Manhattan Rubber Mfg. Div. of Raybestos-Manhattan, Inc., The, 2 Townsend St., Passaic, N. J.

ROLLS—Sand Chilled Iron and Steel
Aetna-Standard Engineering Co., The, Youngstown, Ohio.

Birdsboro (Pa.) Steel Foundry & Machine Co.

Hyde Park (Pa.) Fdry. & Mch. Co.

Lewis Foundry & Mch. Co., Pittsburgh.

Mackintosh-Hemphill Co., Pittsburgh.

Mesta Mch. Co., Pittsburgh.

National Roll & Fdry. Co., Avonmore, Pa.

Pittsburgh (Pa.) Rolls Corp.

United Engineering & Fdry. Co., Pgh.

ROLLS—Special Hardened
Midvale Co., The, Nicetown, Phila., Pa.

ROOFING—Special Copper Bearing Steel
Superior Sheet Steel Co., Canton, Ohio.

ROOFING AND SIDING—Corrugated and Plain
American Rolling Mill Co., Middletown, O.

Carnegie-Illinois Steel Corp. (U. S. Steel Corp. Subsidiary), Pittsburgh & Chicago.

Johns-Manville Corp., 22 East 40th St., New York City.

Weirton (W. Va.) Steel Co.

Youngstown (Ohio) Sheet & Tube Co., The.

ROOFING AND SIDING—Iron and Steel
Inland Steel Co., Chicago.

ROOFING & SIDING—(Zinc)—Corrugated & Plain
New Jersey Zinc Co., The, 160 Front St., N. Y. C.

RUBBER LININGS
Goodrich, B. F. Co., The, Akron, Ohio.

Goodyear Tire & Rubber Co., Akron, Ohio.

RUBBER MOLDED PARTS
Goodyear Tire & Rubber Co., Akron, Ohio.

Manhattan Rubber Mfg. Div. of Raybestos-Manhattan, Inc., The, 2 Townsend St., Passaic, N. J.

Richardson Co., The, Melrose Park, Ill.

RUST PREVENTIVES
American Chemical Paint Co., Ambler, Pa.

American Lanolin Corp., Lawrence, Mass.

Midland Paint & Varnish Co., The, Cleveland.

Parker Rust-Proof Co., 2186 Milwaukee Ave., Detroit.

RUST PROOFING COMPOUNDS
Parker Rust-Proof Co., 2186 Milwaukee Ave., Detroit.

RUST PROOFING PROCESS
American Chemical Paint Co., Ambler, Pa.

Parker Rust-Proof Co., 2186 Milwaukee Ave., Detroit.

Udylite Co., The, Detroit.

SAND BLAST EQUIPMENT AND MACHINES
American Foundry Equipment Co., The, 401 Byrkit St., Mishawaka, Ind.

Panghorn Corporation, Hagerstown, Md.

SAND BLAST STEEL SHOT
American Foundry Equipment Co., The, 401 Byrkit St., Mishawaka, Ind.

Pittsburgh (Pa.) Crushed Steel Co.

SAND HANDLING EQUIPMENT
Bartlett, C. O.-Snow Co., The, Cleveland.

SAWING MACHINES—Metal
Eaton-Lucas Mch. Works, Phila.

Peerless Mch. Co., Racine, Wis.

Tannevitz Works, The, Grand Rapids, Mich.

SAWS—Band and Hack for Metal

Armstrong-Blum Mfg. Co., Chicago.

Atkins, E. C. & Co., Indianapolis.

Dissom, Henry, & Sons, Inc., Philadelphia.

Tannevitz Works, The, Grand Rapids, Mich.

SAWS—Circular, Rip & Cutoff

Atkins, E. C. & Co., Indianapolis.

SAWS—Friction

Atkins, E. C. & Co., Indianapolis.

Dissom, Henry, & Sons, Inc., Philadelphia.

SAWS—Hack Saw Blades

Atkins, E. C. & Co., Indianapolis.

Peerless Mch. Co., Racine, Wis.

Starrett, L. S. Co., Athol, Mass.

SAWS—Hot Metal

Atkins, E. C. & Co., Indianapolis.

Dissom, Henry, & Sons, Inc., Philadelphia.

SAWS—Inserted Tooth, Cold

Dissom, Henry, & Sons, Inc., Philadelphia.

Tabor Mfg. Co., Philadelphia.

SAWS—Milling

Atkins, E. C. & Co., Indianapolis.

Dissom, Henry, & Sons, Inc., Philadelphia.

SAWS—Portable Electric

Black & Decker Mfg. Co., The, Towson, Md.

SCALES

Exact Weight Scale Co., Columbus, Ohio.

Fairbanks, Morse & Co., Chicago.

Streeter-Amet Co., Chicago.

SCREENS—Perforated Metal

Chicago Perforating Co., 2140 W. 24th Place, Chicago, Ill.

Diamond Mfg. Co., Wyoming, Pa.

Endle Perforating Co., Rochester, N. Y.

Harrington & King Perforating Co., Chicago.

Hendrick Mfg. Co., Carbondale, Pa.

Mundt, Chas., & Sons, 59 Fairmount Ave., Jersey City, N. J.

SCREENS—Woven Wire

Wickwire Brothers, Cortland, N. Y.

Wickwire Spencer Steel Co., 41 East 42nd St., N. Y. C.

SCREW MACHINE PRODUCTS

Barnes, Wallace Co., The, Div. of Associated Spring Corp., Bristol, Conn.

Blake & Johnson Co., The, Waterville, Ct.

Commonwealth Brass Corp., Detroit.

Eastern Mch. Screw Corp., New Haven.

Houde Engineering Corp., Buffalo, N. Y.

National Acme Co., The, Cleveland.

Olson Mfg. Co., Worcester, Mass.

Ottmiller, Wm. H. Co., Inc., York, Pa.

Peek Spring Co., The, Poughkeepsie, Conn.

Progressive Mfg. Co., Torrington, Conn.

Screw Mch. Products Corp., Prov., R. I.

SCREW MACHINERY—Automatic

Brown & Sharpe Mfg. Co., Providence,

R. I.

Cone Automatic Mach. Co., Inc., Windsor, Vt.

National Acme Co., The, Cleveland.

SCREW PLATES

Greenfield (Mass.) Tap & Die Corp.

SCREW STOCK

Bliss & Laughlin, Inc., Harvey, Ill.

Union Drawn Steel Co., Massillon, Ohio.

SCREWS—Cap

Cleveland (Ohio) Cap Screw Co., The,

Lamson & Sessions Co., The, Cleveland.

National Acme Co., The, Cleveland.

SCREWS—Safety Set

Progressive Mfg. Co., The, Torrington, Ct.

Standard Pressed Steel Co., Jenkintown, Pa.

SCREWS—Set

Cleveland (Ohio) Cap Screw Co., The,

National Acme Co., The, Cleveland.

Ottmiller, Wm. H. Co., Inc., York, Pa.

SCREWS—Screws

Cleveland (Ohio) Cap Screw Co., The,

National Acme Co., The, Cleveland.

Ottmiller, Wm. H. Co., Inc., York, Pa.

SCREWS—Machine

Blake & Johnson Co., The, Waterville, Ct.

Lamson & Sessions Co., The, Cleveland.

National Acme Co., The, Cleveland.

SCREWS—Safety Set

Progressive Mfg. Co., The, Torrington, Ct.

Standard Pressed Steel Co., Jenkintown, Pa.

SCREWS—Screws

Cleveland (Ohio) Cap Screw Co., The,

National Acme Co., The, Cleveland.

Ottmiller, Wm. H. Co., Inc., York, Pa.

SCREWS—Screws

Cleveland (Ohio) Cap Screw Co., The,

National Acme Co., The, Cleveland.

Ottmiller, Wm. H. Co., Inc., York, Pa.

SCREWS—Screws

Cleveland (Ohio) Cap Screw Co., The,

National Acme Co., The, Cleveland.

Ottmiller, Wm. H. Co., Inc., York, Pa.

SCREWS—Screws

Cleveland (Ohio) Cap Screw Co., The,

National Acme Co., The, Cleveland.

Ottmiller, Wm. H. Co., Inc., York, Pa.

SCREWS—Screws

Cleveland (Ohio) Cap Screw Co., The,

National Acme Co., The, Cleveland.

Ottmiller, Wm. H. Co., Inc., York, Pa.

SCREWS—Screws

Cleveland (Ohio) Cap Screw Co., The,

National Acme Co., The, Cleveland.

Ottmiller, Wm. H. Co., Inc., York, Pa.

SCREWS—Screws

Cleveland (Ohio) Cap Screw Co., The,

National Acme Co., The, Cleveland.

Ottmiller, Wm. H. Co., Inc., York, Pa.

SCREWS—Screws

Cleveland (Ohio) Cap Screw Co., The,

National Acme Co., The, Cleveland.

Ottmiller, Wm. H. Co., Inc., York, Pa.

SCREWS—Screws

Cleveland (Ohio) Cap Screw Co., The,

National Acme Co., The, Cleveland.

Ottmiller, Wm. H. Co., Inc., York, Pa.

SCREWS—Screws

Cleveland (Ohio) Cap Screw Co., The,

National Acme Co., The, Cleveland.

Ottmiller, Wm. H. Co., Inc., York, Pa.

SCREWS—Screws

Cleveland (Ohio) Cap Screw Co., The,

National Acme Co., The, Cleveland.

Ottmiller, Wm. H. Co., Inc., York, Pa.

SCREWS—Screws

Cleveland (Ohio) Cap Screw Co., The,

National Acme Co., The, Cleveland.

Ottmiller, Wm. H. Co., Inc., York, Pa.

SCREWS—Screws

Cleveland (Ohio) Cap Screw Co., The,

National Acme Co., The, Cleveland.

Ottmiller, Wm. H. Co., Inc., York, Pa.

SCREWS—Screws

Cleveland (Ohio) Cap Screw Co., The,

National Acme Co., The, Cleveland.

Ottmiller, Wm. H. Co., Inc., York, Pa.

SCREWS—Screws

Cleveland (Ohio) Cap Screw Co., The,

National Acme Co., The, Cleveland.

Ottmiller, Wm. H. Co., Inc., York, Pa.

SCREWS—Screws

Cleveland (Ohio) Cap Screw Co., The,

National Acme Co., The, Cleveland.

Ottmiller, Wm. H. Co., Inc., York, Pa.

SCREWS—Screws

Cleveland (Ohio) Cap Screw Co., The,

National Acme Co., The, Cleveland.

Ottmiller, Wm. H. Co., Inc., York, Pa.

SCREWS—Screws

Cleveland (Ohio) Cap Screw Co., The,

National Acme Co., The, Cleveland.

Ottmiller, Wm. H. Co., Inc., York, Pa.

SCREWS—Screws

Cleveland (Ohio) Cap Screw Co., The,

National Acme Co., The, Cleveland.

Ottmiller, Wm. H. Co., Inc., York, Pa.

SCREWS—Screws

Cleveland (Ohio) Cap Screw Co., The,

National Acme Co., The, Cleveland.

Ottmiller, Wm. H. Co., Inc., York, Pa.

SCREWS—Screws

Cleveland (Ohio) Cap Screw Co., The,

National Acme Co., The, Cleveland.

Ottmiller, Wm. H. Co., Inc., York, Pa.

SCREWS—Screws

Cleveland (Ohio) Cap Screw Co., The,

National Acme Co., The, Cleveland.

Ottmiller, Wm. H. Co., Inc., York, Pa.

SCREWS—Screws

Cleveland (Ohio) Cap Screw Co., The,

National Acme Co., The, Cleveland.

Ottmiller, Wm. H. Co., Inc., York, Pa.

SCREWS—Screws

Cleveland (Ohio) Cap Screw Co., The,

National Acme Co., The, Cleveland.

Ottmiller, Wm. H. Co., Inc., York, Pa.

JARECKI FITTINGS

Sizes and styles to meet your requirements

Clean, accurate threads

Jarecki Malleable Fittings are made of air-furnace malleable—20% greater tensile strength and elongation than cupola-melted iron

Jarecki Cast-Iron Fittings are made of close-grained gray iron by methods perfected through 86 years' experience.



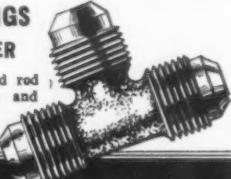
JARECKI MANUFACTURING CO.
Erie, Pennsylvania

BRASS

PIPE and TUBE FITTINGS
for OIL, GAS, AIR or WATER

Made from hot forgings, extruded rod and castings to connect brass and copper tubing.

Write for Catalog I-30.



**COMMONWEALTH
BRASS CORPORATION**

COMMONWEALTH AVE AND 8TH

DETROIT

MOORE RAPID

LECTROMELT FURNACES

For the rapid and economic melting and refining of gray and malleable irons, carbon and alloy steels, etc.

PITTSBURGH LECTROMELT FURNACE CORPORATION
P. O. Box 1257
Pittsburgh, Pa.

MORE AUTOMATIC SPRING MAKING MACHINES

HAVE BEEN MADE DURING THE LAST

TWENTY FIVE YEARS

BY

SLEEPER & HARTLEY INC.
WORCESTER, MASSACHUSETTS

THAN BY ALL OTHER MANUFACTURERS IN
THE WORLD

Products Index

Tennessee Coal, Iron & Railroad Co. (U. S. Steel Corp. Subsidiary), Birmingham, Ala.
Weirton (W. Va.) Steel Co.
Youngstown (Ohio) Sheet & Tube Co., The.

SHEETS—Lead
National Lead Co., 111 Bdway., N. Y. C.

SHEETS—Long Teme
Carnegie-Illinois Steel Corp. (U. S. Steel Corp. Subsidiary), Pittsburgh & Chicago.
Weirton (W. Va.) Steel Co.

SHEETS—Magnesium Alloys
Dow Chemical Co., The, 921 Jefferson Ave., Midland, Mich.

SHEETS—Metal Furniture
Carnegie-Illinois Steel Corp. (U. S. Steel Corp. Subsidiary), Pittsburgh & Chicago.
Republic Steel Corp., Cleveland, Ohio.

SHEETS—Pickled
Carnegie-Illinois Steel Corp. (U. S. Steel Corp. Subsidiary), Pittsburgh & Chicago.

SHEETS—Tin Mill Black
American Rolling Mill Co., Middletown, O.
Carnegie-Illinois Steel Corp. (U. S. Steel Corp. Subsidiary), Pittsburgh & Chicago.

SHEETS—Zinc
New Jersey Zinc Co., The, 160 Front St., Brooklyn, N. Y.

SHELVING—Steel
Frick-Gallagher Mfg. Co., The, Wellston, Ohio.

SHOVELS—Mounted—See Cranes

SHUTTERS—Steel & Wood Bi-Folding

Klineat Mfg. Co., Columbus, Ohio.

SILICO—MANGANESE

Electro Metallurgical Sales Corp., 30 E. 42nd St., N. Y. C.

SILICON METAL & ALLOYS

Electro Metallurgical Sales Corp., 30 E. 42nd St., N. Y. C.

SLINGS—Wire Rope

Murray Safety Sling Co., Inc., Pitts., Pa.
Roehling's, John A., Sons Co., Trenton, N. J.

SLOTTING MACHINES

Nazel Engineering & Machine Works, Philadelphia.

SOLVENTS—Oil & Grease

Detroit Rex Products Co., Detroit, Mich.

SPACING TABLES—Punching & Shearing

Thomas Mach. Mfg. Co., Pittsburgh.

SPECIAL MACHINERY

Baldwin-Southwark Corp., Southwark Div., Philadelphia.

Birdsboro (Pa.) Steel Foundry & Machine Co.

Bullard Co., The, Bridgeport, Conn.

Eastern Tool & Mfg. Co., Bloomfield, N. J.

Farouhar, A. B., Co., Ltd., York, Pa.

Gifford-Wood Co., Hudson, N. Y.

Houde Engineering Corp., Buffalo, N. Y.

Morgan Engineering Co., The, Alliance, O.

Taft-Pelree Mfg. Co., The, Woonsocket, R. I.

Wood, R. D., & Co., Philadelphia.

SPECIALTIES—Rubber Covered & Lined

Goodrich, B. F., Co., The, Akron, Ohio.

SPEED REDUCERS

Boston Gear Wks., Inc., North Quincy, Mass.

Cleveland (Ohio) Worm & Gear Co.

Horsburgh & Scott Co., 5112 Hamilton Ave., Cleveland.

James, D. O., Mfg. Co., Chicago.

Jones, W. A., Fdry. & Mch. Co., 4401 Roosevelt Rd., Chicago.

Link-Belt Co., Chicago.

Philadelphia (Pa.) Gear Works.

Poole Foundry & Mch. Co., Baltimore, Md.

SPIEGELEISEN

Electro Metallurgical Sales Corp., 30 E. 42nd St., N. Y. C.

SPIKES—Screw

Oliver Iron & Steel Corp., Pittsburgh.

SPIKES—Tran

Carnegie-Illinois Steel Corp. (U. S. Steel Corp. Subsidiary), Pittsburgh & Chicago.

Weirton (W. Va.) Steel Co.

SPINDLES—Grinding

Ex-Cell-O Corp., 1200 Oakman Blvd., Detroit.

SPINDLES—Hollow Bored

American Hollow Boring Co., 1912 Raspberry St., Erie, Pa.

SPICE BARS

Carnegie-Illinois Steel Corp. (U. S. Steel Corp. Subsidiary), Pittsburgh & Chicago.

SPRAY FINISHING EQUIPMENT

DeVilbiss Co., The, Toledo, Ohio.

SPRAYERS—Metal

Metals Coating Co. of America, Phila., Pa.

SPRAYERS—Paint

DeVilbiss Co., The, Toledo, Ohio.

SPRING MAKING MACHINERY

Baird Mch. Co., The, Bridgeport, Conn.

Sleeper & Hartley, Inc., Worcester, Mass.

Torrington (Conn.) Mfg. Co., The.

SPRINGS—Car

Miller & Van Winkle, Inc., 18 Bridge St., Brooklyn, N. Y.

SPRINGS—Extension, Compression, Tension or Flat

Amer. Spring & Mfg. Corp., Holly, Mich.
American Steel & Wire Co. (U. S. Steel Corp. Subsidiary), Chicago.

Barnes-Gibson-Raymond, Detroit Plant, Div. of Associated Spring Corp.

Barnes, Wallace Co., The, Div. of Associated Spring Corp., Bristol, Conn.

Cook Plant of Barnes-Gibson-Raymond, Div. of Associated Spring Corp., Ann Arbor, Mich.

Cuyahoga Spring Co., The, Cleveland.

Dublin Bros. Co., Div. of Associated Spring Corp., Bristol, Conn.

Gibson, Wm. D., Co., Div. of Associated Spring Corp., Chicago.

Hubbard, M. D., Spring Co., 750 Central Ave., Pontiac, Mich.

Lee Spring Co., Inc., 30 Main St., Brooklyn, N. Y.

Miller & Van Winkle, Inc., 18 Bridge St., Brooklyn, N. Y.

Peek Spring Co., The, Plainville, Conn.

Raymond Mfg. Co., Div. of Associated Spring Corp., Corry, Pa.

U. S. Steel Wire Spring Co., Cleveland, O.

Wickwire Spencer Steel Co., 41 East 42nd St., N. Y. C.

SPROCKETS

Baldwin-Duckworth Chain Corp., Springfield, Mass.

Boston Gear Wks., Inc., North Quincy, Mass.

Diamond Chain & Mfg. Co., Indianapolis, Ind.

Morse Chain Co., Ithaca, New York.

Whitney Chain & Mfg. Co., Hartford, Ct.

STAMPINGS OR DRAWINGS—Metal

Barnes-Gibson-Raymond, Detroit Plant, Div. of Associated Spring Corp.

Barnes, Wallace Co., The, Div. of Associated Spring Corp., Bristol, Conn.

Central Iron & Steel Co., Harrisburg, Pa.

Champion Sheet Metal Co., Inc., cor.

Squires & Duane Sts., Cortland, N. Y.

Cook Plant of Barnes-Gibson-Raymond, Div. of Associated Spring Corp., Ann Arbor, Mich.

Crosby Co., The, Buffalo, N. Y.

Dayton Rogers Mfg. Co., Minneapolis, Minn.

Dunbar Bros. Co., Div. of Associated Spring Corp., Bristol, Conn.

E S M C O Auto Products Corp., Bush Terminal Bldg., 27, Bklyn., N. Y.

Eastern Tool & Stg. Co., Inc., Saugus, Mass.

Gibson, Wm. D., Co., Div. of Associated Spring Corp., Chicago.

Grinnell, L. F., & Sons, Inc., Allentown, Pa.

Hubbard, M. D., Spring Co., 750 Central Ave., Pontiac, Mich.

Lansing (Mich.) Stamping Co., So. Penn.

Parish Pressed Steel Co., Reading, Pa.

Raymond Mfg. Co., Div. of Associated Spring Corp., Corry, Pa.

Sessions, J. H., & Son, Bristol, Conn.

Special Hardware Co., Medford, N. Y.

Toledo (Ohio) Stamping & Mfg. Co.

Torrington (Conn.) Company

Transue & Williams Steel Forging Corp., Alliance, Ohio.

Truscon Steel Co., Pressed Steel Div., Cleveland.

Wagner Specialty Co., Burlington, Wis.

Whitehead Stamping Co., 1669 W. Lafayette Blvd., Detroit, Mich.

Worcester (Mass.) Stamped Metal Co.

STAMPS—Steel Alphabets and Figures

Cunningham, M. E., Co., Pittsburgh.

Noble & Westbrook Mfg. Co., The, East Hartfrod, Ct.

STAPLES—Wire

Wickwire Brothers, Cortland, N. Y.

STEEL—Acid Resisting

Duriron Co., Inc., The, 438 N. Findlay St., Dayton, Ohio.

STEEL—Alloy

Alan Wood Steel Co., Conshohocken, Pa.

American Steel Expert Co., Inc., 347 Madison Ave., N. Y. C.

Bethlehem (Pa.) Steel Company.

Bissett Steel Co., The, Cleveland.

Carnegie-Illinois Steel Corp. (U. S. Steel Corp. Subsidiary), Pittsburgh & Chicago.

Harrisburg (Pa.) Steel Corp.

Ingersoll Steel & Disc Co., Chicago.

Jesson Steel Co., Washington, Pa.

Latrobe (Pa.) Electric Steel Co.

Ludlum Steel Co., Watervliet, N. Y.

Republic Steel Corp., Cleveland, Ohio.

Ryerson, Jos. T., & Son, Inc., Chicago.

Tennessee Coal, Iron & Railroad Co. (U. S. Steel Corp. Subsidiary), Birmingham, Ala.

Timken Roller Bearing Co., The, Canton, O.

Timken Steel & Tube Div., The Timken Roller Bearing Co., Canton, O.

Vanadium-Alloys Steel Co., Latrobe, Pa.

Wheelock, Lovejoy & Co., Inc., Cambridge, Mass.

STEEL—Alloy, Cold Drawn

Biss & Laughlin, Inc., Harvey, Ill.

Union Drawn Steel Co., Massillon, Ohio.

Wheelock, Lovejoy & Co., Inc., Cambridge, Mass.

Wyckoff Drawn Steel Co., Pittsburgh, Pa.

Products Index

STEEL—Bright Finished
Bliss & Laughlin, Inc., Harvey, Ill.
Union Drawn Steel Co., Massillon, Ohio.

STEEL—Carbon
American Steel Export Co., Inc., 347 Madison Ave., N. Y. C.
Bethlehem (Pa.) Steel Co.
Carnegie-Illinois Steel Corp. (U. S. Steel Corp. Subsidiary), Pittsburgh & Chicago.
Harrisburg (Pa.) Steel Corp.
Ingersoll Steel & Disc Co., Chicago.
Latrobe (Pa.) Electric Steel Co.

STEEL—Carbon Vanadium
Latrobe (Pa.) Electric Steel Co.

STEEL—Chrome
Latrobe (Pa.) Electric Steel Co.

STEEL—Chrome Manganese
Latrobe (Pa.) Electric Steel Co.

STEEL—Chrome Nickel
Harrisburg (Pa.) Steel Corp.
Latrobe (Pa.) Electric Steel Co.

STEEL—Chrome Nickel Silver
Ingersoll Steel & Disc Co., Chicago.

STEEL—Chrome Vanadium
Harrisburg (Pa.) Steel Corp.
Latrobe (Pa.) Electric Steel Co.

STEEL—Cobalt
Darwin & Milner, Inc., Cleveland.

STEEL—Cold Drawn
Bliss & Laughlin, Inc., Harvey, Ill.

Jones & Laughlin Steel Corp., Pittsburgh.

Latrobe (Pa.) Electric Steel Co.

Rathbone, A. R. & J., Palmer, Mass.

Ryerson, Joseph T., & Sons, Inc., Chicago.

Union Drawn Steel Co., Massillon, Ohio.

Wyckoff Drawn Steel Co., Pittsburgh, Pa.

STEEL—Cold Rolled Strips

Acme Steel Co., Chicago.

American Steel & Wire Co. (U. S. Steel Corp. Subsidiary), Chicago.

Athenia Steel Co., Clifton, N. J.

Bethlehem (Pa.) Steel Co.

Cold Metal Process Co., The, Youngstown, Ohio.

Griffin Mfg. Co., Erie, Pa.

Latrobe (Pa.) Electric Steel Co.

Republic Steel Corp., Cleveland, Ohio.

Ryerson, Jos. T., & Sons, Inc., Chicago.

Scully Steel Products Co. (U. S. Steel Corp. Subsidiary), Chicago.

Stanley Works, The, New Britain, Conn.:

Bridgeport, Conn.

Steel & Tubes, Inc., Cleveland.

Superior Steel Corp., Grant Bldg., Pittsburgh.

Thomas Steel Co., The, Warren, Ohio.

Weirton (W. Va.) Steel Co.

Wetherell Bros. Co., Cambridge, 39, Mass.

STEEL—Cold Rolled Strips, Electro Coated

Thomas Steel Co., The, Warren, Ohio.

STEEL—Cold Rolled Strips, Electro Galvanized

Acme Steel Co., Chicago, Ill.

Thomas Steel Co., The, Warren, Ohio.

STEEL—Cold Rolled Strips, Electro Tin Coated

Thomas Steel Co., The, Warren, Ohio.

STEEL—Cold Rolled Strips, Stainless

Acme Steel Co., Chicago.

Griffin Mfg. Co., Erie, Pa.

STEEL—Corrosion Resisting

Midvale Co., The, Nicetown, Phila., Pa.

Rustless Iron & Steel Corp., Baltimore, Md.

STEEL—Crucible

Jessop, Wm. & Sons, Inc., 121 Varick St., N. Y. C.

Jessop Steel Co., Washington, Pa.

Vanadium-Alloys Steel Co., Latrobe, Pa.

STEEL—Cutting

Jessop Steel Co., Washington, Pa.

Latrobe (Pa.) Electric Steel Co.

Ludlum Steel Co., Watervliet, N. Y.

Latrobe (Pa.) Electric Steel Co.

Ludlum Steel Co., Watervliet, N. Y.

Milne, A. & Co., 745 Washington St., N. Y. C.

STEEL—Drill

Latrobe (Pa.) Electric Steel Co.

Ludlum Steel Co., Watervliet, N. Y.

Milne, A. & Co., 745 Washington St., N. Y. C.

STEEL—Electric

Douston, Henry, & Sons, Inc., Philadelphia.

Latrobe (Pa.) Electric Steel Co.

Ludlum Steel Co., Watervliet, N. Y.

Timken Roller Bearing Co., The, Canton, O.

Timken Steel & Tube Div., The Timken

Roller Bearing Co., Canton, O.

Wheelock, Lovejoy & Co., Inc., Cambridge, Mass.

STEEL—High Speed

Bethlehem (Pa.) Steel Company.

Cleveland (Ohio) Twist Drill Co., The.

Ingersoll Steel & Disc Co., Chicago.

Jessop Steel Co., Washington, Pa.

Latrobe (Pa.) Electric Steel Co.

Ludlum Steel Co., Watervliet, N. Y.

Milne, A. & Co., 745 Washington St., N. Y. C.

Vanadium-Alloys Steel Co., Latrobe, Pa.

STEEL—Hot Rolled Strips

Acme Steel Co., Chicago.

Bethlehem (Pa.) Steel Co.

Carnegie-Illinois Steel Corp. (U. S. Steel Corp. Subsidiary), Pittsburgh & Chicago.

Great Lakes Steel Corp., Detroit.

Inland Steel Co., Chicago.

Laclede Steel Co., St. Louis, Mo.

Latrobe (Pa.) Electric Steel Co.

Republic Steel Corp., Cleveland, Ohio.

Scully Steel Products Co. (U. S. Steel Corp. Subsidiary), Chicago.

Stanley Works, The, New Britain, Conn. Bridgeport, Conn.

Steel & Tubes, Inc., Cleveland.

Superior Steel Corp., Grant Bldg., Pittsburgh.

Weirton (W. Va.) Steel Co.

STEEL—Hot Rolled Strips, Electro Zinc Coated

Thomas Steel Co., The, Warren, Ohio.

STEEL—Hot Rolled Strips, Galvanized

Acme Steel Co., Chicago.

STEEL—Magnets

Latrobe (Pa.) Electric Steel Co.

STEEL—Open Hearth

Pittsburgh (Pa.) Steel Co.

Timken Roller Bearing Co., The, Canton, O.

Timken Steel & Tube Div., The Timken Roller Bearing Co., Canton, O.

STEEL—Rustless

Acme Steel Co., Chicago.

Griffin Mfg. Co., Erie, Pa.

Latrobe (Pa.) Electric Steel Co.

Ludlum Steel Co., Watervliet, N. Y.

Rustless Iron & Steel Corp., Baltimore, Md.

STEEL—Screws

Bliss & Laughlin, Inc., Harvey, Ill.

Timken Roller Bearing Co., The, Canton, O.

Timken Steel & Tube Div., The Timken Roller Bearing Co., Canton, O.

Union Drawn Steel Co., Massillon, Ohio.

Wyckoff Drawn Steel Co., Pittsburgh, Pa.

STEEL—Special Analysis

Harrisburg (Pa.) Steel Corp.

Latrobe (Pa.) Electric Steel Co.

Ludlum Steel Co., Watervliet, N. Y.

Republic Steel Corp., Cleveland, Ohio.

Timken Roller Bearing Co., The, Canton, O.

Timken Steel & Tube Div., The Timken

Roller Bearing Co., Canton, O.

STEEL—Spring

Athenia Steel Co., Clifton, N. J.

Barnes-Gibson-Raymond, Detroit Plant.

Div. of Associated Spring Corp.

Barnes, Wallace, Co., The, Div. of Associated Spring Corp., Bristol, Conn.

Gibson, Wm. D., Co., Div. of Associated Spring Corp., Chicago.

Great Lakes Steel Corp., Detroit.

Republic Steel Corp., Cleveland, Ohio.

Timken Roller Bearing Co., The, Canton, O.

Timken Steel & Tube Div., The Timken

Roller Bearing Co., Canton, O.

STEEL—Stainless

Acme Steel Co., Chicago.

American Rolling Mill Co., Middletown, O.

Bethlehem (Pa.) Steel Company.

Carnegie-Illinois Steel Corp. (U. S. Steel Corp. Subsidiary), Pittsburgh & Chicago.

Rustless Iron & Steel Corp., Baltimore, Md.

Ryerson, Jos. T., & Sons, Inc., Chicago.

Scully Steel Products Co. (U. S. Steel Corp. Subsidiary), Chicago.

Superior Steel Corp., Grant Bldg., Pittsburgh.

Union Drawn Steel Co., Massillon, Ohio.

Wetherell Bros. Co., Cambridge, 39, Mass.

STEEL—Stainless Clad

Ingersoll Steel & Disc Co., Chicago.

STEEL—Tool

Bethlehem (Pa.) Steel Company.

Bissell Steel Co., The, Cleveland.

Darwin & Milner, Inc., Cleveland.

Douston, Henry, & Sons, Inc., Philadelphia.

Ingersoll Steel & Disc Co., Chicago.

Jessop Steel Co., Washington, Pa.

Jessop, Wm. & Sons, Inc., 121 Varick St., N. Y. C.

Latrobe (Pa.) Electric Steel Co.

Ludlum Steel Co., Watervliet, N. Y.

Midvale Co., The, Nicetown, Phila., Pa.

Republic Steel Corp., Cleveland, Ohio.

Rustless Iron & Steel Corp., Baltimore, Md.

Wheelock, Lovejoy & Co., Inc., Cambridge, Mass.

Windas Steel Co., Cleveland.

STEEL—Tool, Special Shapes

Forging & Casting Corp., The, Ferndale, Mich.

Latrobe (Pa.) Electric Steel Co.

STEEL—Vanadium

Latrobe (Pa.) Electric Steel Co.

STEEL PLANTS AND ROLLING MILLS

Brassert, H. A., & Co., Chicago, Ill.

STEEL ROLLS

United Engineering & Foundry Co., Pittsburgh.

STOKERS

Babcock & Wilcox, The, 85 Liberty St., New York City.

Whiting Corp., Harvey, Ill.



Made to order Cold Upset and Rolled Thread products by Progressive are assurance against time and labor troubles in assembly operations. It will pay you to consult our specialists before placing your next order. Their suggestions may show you the way to greater fastening economy.

The PROGRESSIVE MFG. CO.
TORRINGTON... CONNECTICUT

NAILS, RIVETS & SCREWS MADE TO ORDER IN ANY METAL
JOHN HASSALL, INC. EST. 1850 CLAY & OAKLAND STS., BROOKLYN, N.Y.

SCREW MACHINE PRODUCTS
CAP AND SET SCREWS
WM. H. OTTEMILLER CO., Inc.
Pattison St. & M & PRR York, Pa.

SCREW MACHINE PRODUCTS
ACCURATELY MADE
AT A FAIR PRICE
ARE MORE ECONOMICAL

Specialists in the production of screw machine products for 15 years. Let us quote on your requirements.

Screw Machine Products Corp., 1014 Eddy St., Providence, R.I.

PARKER-KALON Cold-forged
WING NUTS & THUMB SCREWS

Made by a new and improved process. Neater, stronger—yet cost no more!

Compare—get prices and samples from Parker-Kalon Corp., 200 Varick St., New York

Products Index

TESTING MACHINES—Spring
Crane Limit Electric Controller & Mfg. Co., The, Cleveland.

TESTING MACHINES—Bar & Tube
Aetna-Standard Engineering Co., The, Youngstown, Ohio.
Medart Co., The, St. Louis, Mo.

STRUCTURAL IRON AND STEEL WORK
American Bridge Co. (U. S. Steel Corp. Subsidiary), Pittsburgh.
Bethlehem (Pa.) Steel Co.
Morgan Engineering Co., The, Alliance, O.

STRUCTURAL STEEL—See Angles, Beams, Channels and Tees

STUDS
Erie (Pa.) Bolt & Nut Co.

SUB PRESSES
U. S. Tool Co., Inc., Ampere, N. J.

SUPERHEATERS
Iabcock & Wilcox Co., The, 85 Liberty St., New York City.

SWAGING MACHINES
Standard Machinery Co., Providence, R. I.
Torrington (Conn.) Company.

SWITCHES—Electric
Westinghouse Elec. & Mfg. Co., East Pittsburgh.

TANK LININGS
Clecoite Co., The, Cleveland.
Nukem Prods. Corp., 68 Niagara St., Buffalo, N. Y.

TANK LININGS—Rubber
Goodrich, B. F. Co., The, Akron, Ohio.
Goodyear Tire & Rubber Co., Akron, Ohio.
Manhattan Rubber Mfg. Div. of Raybestos-Manhattan, Inc., The, 2 Townsend St., Passaic, N. J.

TANKS—Alkali Cleaning
Detroit Rex Products Co., Detroit, Mich.

TANKS—Compressed Air, Gas, Oil and Water
Scaife, Wm. B., & Sons Co., Pittsburgh.
Westinghouse Air Brake Co., Industrial Div., Pittsburgh.

TANKS—Iron and Steel
Munroe R. & Sons Mfg. Corp., Pittsburgh.
Scaife, Wm. B., & Sons, Co., Pittsburgh.

TANKS—Lead Lined
Dietzel Lead Burning Co., Pittsburgh.

TANKS—Pickling
Atlas Mineral Prods. Co. of Pa., The, Blaw-Knox Co., Pittsburgh.
Cleveland (Ohio) Quarries Co., The.
Goodrich, B. F. Co., The, Akron, Ohio.
Goodyear Tire & Rubber Co., Akron, Ohio.
Havoc Corporation, Newark, Delaware.
Manhattan Rubber Mfg. Div. of Raybestos-Manhattan, Inc., The, 2 Townsend St., Passaic, N. J.

TANKS—Rubber Lined
Blaw-Knox Co., Pittsburgh.
Goodrich, B. F. Co., The, Akron, Ohio.
Goodyear Tire & Rubber Co., Akron, Ohio.
Manhattan Rubber Mfg. Div. of Raybestos-Manhattan, Inc., The, 2 Townsend St., Passaic, N. J.

TANKS—Welded
Blaw-Knox Co., Pittsburgh.
National Tube Co. (U. S. Steel Corp. Subsidiary), Pittsburgh.
Scaife, Wm. B., & Sons Co., Pittsburgh.

TAPPING MACHINES
Baker Bros., Inc., Toledo, Ohio.
Ex-Cell-O Corp., 1200 Oakman Blvd., Detroit.
National Automatic Tool Co., Richmond, Ind.

TAPS AND DIES
Greenfield (Mass.) Tap & Die Corp.
Lands Mch. Co., Inc., Waynesboro, Pa.
Morse Twist Drill & Mch. Co., New Bedford, Mass.
Pratt & Whitney Div. Niles-Bement-Pond Co., Hartford, Conn.

TEES—See Angles, Beams, Channels and Tees

TELEPHONES—Interior
Screw Machine Products Corp., Prov., R. I.

TERNE PLATES
Carnegie-Illinois Steel Corp. (U. S. Steel Corp. Subsidiary), Pittsburgh & Chicago.
Wolfe, W. M., Co., 1892 Beard Ave., Detroit.

TESTING MACHINES—Ductility
Olsen, Tinius Testing Machine Co., Philadelphia.

TESTING MACHINES—Hardness
Olsen, Tinius Testing Machine Co., Philadelphia.

TESTING MACHINES—Imprint
Olsen, Tinius Testing Machine Co., Philadelphia.

TESTING MACHINES—Materials
Balkein-Southwark Corp., Southwark Div., Phila.
Olsen, Tinius Testing Machine Co., Philadelphia.

TRANSCRIBING MACHINES
Dictaphone Sales Corp., 420 Lexington Ave., New York City.

TRANSMISSIONS—Hydraulic
American Engineering Co., Philadelphia.
Oilgear Co., The, 1311 W. Bruce St., Milwaukee.

TRANSMISSIONS—Variable Speed
Link-Belt Co., Chicago.
Reeve Pulley Co., Columbus, Indiana.

TRAPS—Steam
Nicholson, W. H., & Co., 165 Oregon St., Wilkes-Barre, Pa.

Products Index

TREADS—Safety

American Pressed Steel Co., Phila., Pa.
Blaw-Knox Co., Pittsburgh.
Central Iron & Steel Co., Harrisburg, Pa.
Hendrick Mfg. Co., Carbondale, Pa.
Norton Co., Worcester, Mass.

TROLLEYS

Curtis Pneumatic Machinery Co., 1948 Kienlen Ave., St. Louis, Mo.
Hanna Engineering Works, 1761 Elston Ave., Chicago.

TRUCKS—Dump (Industrial)

Towmotor, Inc., Cleveland.

TRUCKS—Elevating (Power)

Baker-Raulang Co., The, 2175 W. 25th St., Cleveland.

Barrett-Cravens Co., Chicago.

Eiwell-Parker Electric Co., The, Cleveland.

Towmotor, Inc., Cleveland.

Yale & Towne Mfg. Co., The, Phila. Div., Phila., Pa.

TRUCKS—Factory, Hand

Lewis-Shepard Co., 122 Walnut St., Water-town Station, Boston.

TRUCKS—Lift (Hand & Foot)

Barrett-Cravens Co., Chicago, Illinois.

Lewis-Shepard Co., 122 Walnut St., Water-town Station, Boston.

Yale & Towne Mfg. Co., The, Phila. Div., Phila., Pa.

TRUCKS—Scoop (Industrial)

Towmotor, Inc., Cleveland.

TRUCKS, TRACTORS AND TRAILERS—Industrial

Atlas Car & Mfg. Co., The, Cleveland.

Baker-Raulang Co., The, 2175 W. 25th St., Cleveland.

Eiwell-Parker Electric Co., The, Cleveland.

Towmotor, Inc., Cleveland.

Yale & Towne Mfg. Co., The, Phila. Div., Phila., Pa.

TUBE MILL MACHINERY

Aetna-Standard Engineering Co., The, Youngstown, Ohio.

Taylor-Wilson Mfg. Co., McKees Rocks, Pa.

United Engineering & Fdry. Co., Pgh.

Waterbury (Conn.) Farrel Foundry & Machine Co., The.

TUBES—Boiler

National Tube Co. (U. S. Steel Corp. Subsidiary) Pittsburgh.

Ohio Seamless Tube Co., Shelby, Ohio.

Pittsburgh (Pa.) Steel Co.

Steel & Tubes, Inc., Cleveland.

TUBES—Copper Alloy

American Brass Co., The, Waterbury, Conn.

TUBES—High Carbon

Ohio Seamless Tube Co., Shelby, Ohio.

Steel & Tubes, Inc., Cleveland.

TUBES—Nickel Silver

American Brass Co., The, Waterbury, Conn.

Revere Copper & Brass, Inc., 230 Park Ave., N. Y. C.

TUBES—Stainless Steel

Cleveland (Ohio) Tool & Supply Co., The.

National Tube Co. (U. S. Steel Corp. Subsidiary) Pittsburgh.

Ryerson, Jos. T., & Son, Inc., Chicago.

Steel & Tubes, Inc., Cleveland.

TUBING—Aluminum Seamless

Aluminum Co. of America, Pittsburgh.

TUBING—Flexible Metallic

Pennsylvania Flexible Metallic Tubing Co., Philadelphia.

TUBING—Magnesium Alloys

Dow Chemical Co., The, 921 Jefferson Ave., Midland, Mich.

TUBING—Nichrome

Steel & Tubes, Inc., Cleveland.

TUBING—Open Seam

Steel & Tubes, Inc., Cleveland.

TUBING—Phosphor Bronze

American Brass Co., The, Waterbury, Conn.

Phosphor Bronze Smelting Co., The, Phila.

Revere Copper & Brass, Inc., 230 Park Ave., N. Y. C.

TUBING—Rubber

Goodrich, B. F. Co., The, Akron, Ohio.

TUBING—Seamless Steel

National Tube Co. (U. S. Steel Corp. Subsidiary) Pittsburgh.

Ohio Seamless Tube Co., Shelby, Ohio.

Pittsburgh (Pa.) Steel Co.

Ryerson, Jos. T., & Son, Inc., Chicago.

Steel & Tubes, Inc., Cleveland.

TUBING—Tinned Brass or Copper

Bundy Tubing Co., Detroit, Mich.

TUBING—Tinned-Steel

Bundy Tubing Co., Detroit, Mich.

TUBING—Tool Steel

Bissell Steel Co., The, Cleveland.

TUBING—Welded Steel

Rundy Tubing Co., Detroit, Mich.

National Tube Co. (U. S. Steel Corp. Subsidiary) Pittsburgh.

Ohio Seamless Tube Co., Shelby, Ohio.

Steel & Tubes, Inc., Cleveland.

Youngstown (Ohio) Sheet & Tube Co., The.

TUBULAR PRODUCTS

National Tube Co. (U. S. Steel Corp. Subsidiary), Pittsburgh.

Steel & Tubes, Inc., Cleveland.

TUMBLING BARRELS—See Barrels—Tumbling

TUNGSTEN—Metals & Alloys

Electro Metallurgical Sales Corp., 30 E. 42nd St., N. Y. C.

TUNGSTEN CARBIDE

Carboly Co., Inc., 2985 E. Jefferson Ave., Detroit.

TURBINE-GENERATORS—Steam

General Electric Co., Schenectady, N. Y.

Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.

TURBO-COMPRESSORS

Spence Turbine Co., Hartford, Conn.

TURNTABLES

American Bridge Co. (U. S. Steel Corp. Subsidiary), Pittsburgh.

TURNTABLES—Industrial

Canton Flyer & Mch. Co., Cleveland.

TWIST DRILLS

Cleveland (Ohio) Twist Drill Co., The.

Greenfield (Mass.) Tap & Die Corp.

Moore Twist Drill & Mch. Co., New Bedford, Mass.

TYPE—Steel

Noble & Westbrook Mfg. Co., The, East Hartford, Ct.

UNIONS

Crane Co., Chicago.

UNIT HEATERS—Electric

American Foundry Equipment Co., The.

401 Byrkit St., Mishawaka, Ind.

VALVES—Acid Resisting

Dietzel Lead Burning Co., Pittsburgh.

Duriron Co., Inc., The, 438 N. Findlay St., Dayton, Ohio.

National Lead Co., 111 Edway, N. Y. C.

VALVES—Air Blast for Presses

Littell, F. J., Mch. Co., Chicago.

VALVES—Air & Hydraulic Control

Brown Instrument Co., The, Philadelphia, Pa.

VALVES—Gas Water and Steam

Brown Instrument Co., The, Philadelphia, Pa.

Crown Co., Chicago.

Jarecki Mfg. Co., Erie, Pa.

North American Mfg. Co., The, Cleveland.

Wood, R. D., & Co., Philadelphia.

VALVES—Hydraulic

Baldwin-Southwark Corp., Southwark Div., Philadelphia.

Birdsboro (Pa.) Steel Foundry & Machine Co., Philadelphia.

Crane Co., Chicago.

Galland-Henning Mfg. Co., Milwaukee.

Hanna Engineering Works, 1761 Elston Ave., Chicago.

Hamlin Mfg. Co., Chicago.

Nicholson, H. & Co., 165 Oregon St., Wilkes-Barre, Pa.

Tomkins-Johnson Co., The, Jackson, Mich.

Westinghouse Air Brake Co., Industrial Div., Pittsburgh.

VALVES—Gas Water and Steam

Brown Instrument Co., The, Philadelphia, Pa.

North American Mfg. Co., The, Cleveland.

VALVES—(Pressure Seated) Pneumatic

Cleveland (Ohio) Pneumatic Tool Co., The.

VALVES—Proportioning

Brown Instrument Co., The, Philadelphia, Pa.

North American Mfg. Co., The, Cleveland.

VALVES—Pump, Rubber

Garlock Packing Co., The, Palmyra, N. Y.

VANADIUM

Electro Metallurgical Sales Corp., 30 E. 42nd St., N. Y. C.

VISSES

Cincinnati (Ohio) Milling Mch. Co., The.

Jarecki Mfg. Co., Erie, Pa.

Knu-Vise Products Co., Detroit, Mich.

WASHERS—Iron or Steel

Sessions, J. H., & Son, Bristol, Conn.

WASHERS—Leather

Chicago (Ill.) Rawhide Mfg. Co., The, 1306 Elston Ave.

WASHERS—Lock

American Nut & Bolt Fastener Co., Pittsburgh.

Real Tool Co., East Alton, Ill.

Butcher & Hart Mfg. Co., Toledo, Ohio.

Eaton Mfg. Co., Massillon, Ohio.

Hobbs Mfg. Co., Worcester, Mass.

Houde Engineering Co., Buffalo, N. Y.

National Lock Washer Co., The, Newark, N. J.

Philippines Steel & Wire Corp., Germantown, Philadelphia, Pa.

Positive Lock Washer Co., The, Newark, N. J.

Spring Washer Industry, 616 Wrigley Bldg., Chicago, Ill.

Washburn Co., The, Worcester, Mass.

WASHERS—Spring

American Nut & Bolt Fastener Co., Pittsburgh.

Real Tool Co., East Alton, Ill.

Butcher & Hart Mfg. Co., Toledo, Ohio.

Eaton Mfg. Co., Massillon, Ohio.

Hobbs Mfg. Co., Worcester, Mass.

National Lock Washer Co., The, Newark, N. J.

Philippines Steel & Wire Corp., Germantown, Philadelphia, Pa.

Positive Lock Washer Co., The, Newark, N. J.

Spring Washer Industry, 616 Wrigley Bldg., Chicago, Ill.

Washburn Co., The, Worcester, Mass.

THE BEST KNOWN NAME IN IRON

HANNA

For 70 Years

... foundrymen have recognized Hanna quality as a standard for comparison. Such a reputation is especially significant today, when close adherence to specifications is so important.



THE HANNA FURNACE CORPORATION

MERCHANT PIG IRON DIVISION
OF NATIONAL STEEL CORPORATION

Buffalo Detroit New York Philadelphia Boston

MEMPHIS OF HIGH GRADE
FOUNDRY BASIC GREY FORGE
MALLEABLE BESSEMER LOW PHOS.

WIRE CLOTH
WIRE PRODUCTS
ALL METALS
ALL INDUSTRIAL PURPOSES
CATALOG 10 K

BUFFALO WIRE WORKS CO., INC.

(Established 1869 in Buffalo, N. Y.)

10 TERRACE BUFFALO, N. Y.

RIVETED KEYS—FLAT SPRING KEYS

—COTTER PINS—

WESTERN WIRE PRODUCTS CO.

ST. LOUIS, U. S. A.

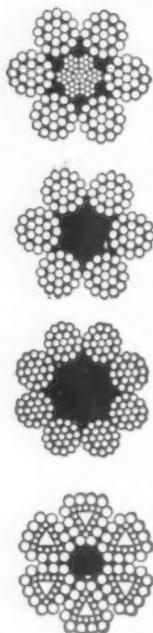
MITCO
OPEN STEEL FLOORING

Pressure Formed : 90% Open Area : Easy to Install

HENDRICK MANUFACTURING COMPANY

37 Dundoff Street, Carbondale, Pa.

Leschen Wire Rope for Every Requirement



In successful Wire Rope usage construction is a factor quite as important as the proper selection of material.

The accompanying illustrations show cross section views of some of the various constructions we furnish. Every construction is made according to the "Leschen" standard.

If you are experiencing any Wire Rope trouble, probably either the construction or the quality is not suited to your particular work, our Engineering Department will gladly advise with you, without putting you under any obligation.

Established 1857

A. Leschen & Sons Rope Co.

Makers of
HERCULES (Red-Strand) WIRE ROPE

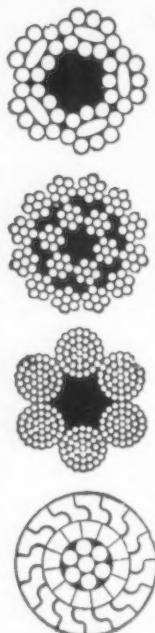
ST. LOUIS, U. S. A.

New York

Chicago

Denver

San Francisco



Products Index

WASHING MACHINES—For Metal Parts
Ranshoff, N., Inc., Cincinnati.

WASTE—Wiping
Lillie, Dexter P., Co., New Bedford, Mass.

WATER SOFTENERS AND PURIFIERS
Sealfie, Wm. B., & Sons Co., Ptgh.

WELDING—Copper Hydrogen Electric
Bundy Tubing Co., Detroit, Mich.

WELDING—Electric
Federal Machine & Welder Co., Warren,
Lincoln Electric Co., The, Cleveland,
Una Welding, Inc., Cleveland, Ohio,
Westinghouse Elec. & Mfg. Co., East Ptgh.

WELDING CONTACTS—Resistance
Electroly Co., Inc., 50 Church St., New
York City.

WELDING AND CUTTING MACHINES
AND EQUIPMENT—Oxy-Acetylene

Air Reduction Sales Co., 60 East 42nd
St., N. Y. C.
Little Air Products Company, The, 30 East
42nd St., N. Y. C.
Weldit Acetylene Co., Detroit.

WELDING FIXTURES
Harnischfeger Corp., 4401 W. National
Ave., Milwaukee.

Una Welding, Inc., Cleveland, Ohio.

WELDING MACHINES—Butt
Federal Machine & Welder Co., Warren,
Ohio.
Swift Electric Welder Co., Detroit,
Thomson-Gibb Elec. Welding Co., Lynn,
Mass.

WELDING MACHINES—Electric Arc
Electric Arc Cutting & Welding Co.,
The, Newark, N. J.
General Electric Co., Schenectady, N. Y.
Harnischfeger Corp., 4401 W. National
Ave., Milwaukee, Wis.
Lincoln Electric Co., The, Cleveland,
Una Welding, Inc., Cleveland, Ohio,
Westinghouse Elec. & Mfg. Co., East Ptgh.
Wilson Welder & Metals Co., Inc., 60 E.
42nd St., New York City.

WELDING MACHINES—Electric Arc,
Second-Hand. (See Clearing House
Section)

WELDING MACHINES—Flash
Federal Machine & Welder Co., Warren,
Ohio.
Swift Electric Welder Co., Detroit,
Thomson-Gibb Elec. Welding Co., Lynn,
Mass.

WELDING MACHINES—Press
Federal Machine & Welder Co., Warren,
Ohio.
Swift Electric Welder Co., Detroit.

WELDING MACHINES—Seam
Federal Machine & Welder Co., Warren,
Ohio.

WELDING MACHINES—Spot
Federal Machine & Welder Co., Warren,
Ohio.
Swift Electric Welder Co., Detroit,
Thomson-Gibb Elec. Welding Co., Lynn,
Mass.

WELDING MACHINES—Universal Spot
& Arc
Electric Arc Cutting & Welding Co.,
The, Newark, N. J.

WHEELS—Rolled Steel
Carnegie-Illinois Steel Corp. (U. S. Steel
Corp. Subsidiary), Pittsburgh & Chi-
cago.
Standard Steel Wks. Co., Burnham, Pa.

WIRE—Aluminum
Aluminum Co. of America, Pittsburgh.

WIRE—Barb
Jones & Laughlin Steel Corp., Pittsburgh,
Pittsburgh (Pa.) Steel Co.

WIRE—Brass, Bronze, Copper, Nickel
Silver & Phosphor Bronze
American Brass Co., The, Waterbury, Conn.
Phosphor Bronze Smelting Co., The, Phila.,
Revere Copper & Brass, Inc., 230 Park
Ave., N. Y. C.
Seymour (Conn.) Mfg. Co.

WIRE—Electric Heat Resisting
Ginbar Div., The Carborundum Co.,
Niagara Falls, N. Y.

WIRE—Flat, Round, Square or Special
Shapes

American Steel & Wire Co. (U. S. Steel
Corp. Subsidiary), Chicago.

Barnes, Wallace Co., The, Div. of Asso-
ciated Spring Corp., Bristol, Conn.
Page Steel & Wire Div., American Chain
& Cable Co., Inc., Monessen, Pa.

Prestiss, Geo. W., & Co., Holyoke, Mass.
Roebling's, John A., Sons Co., Trenton, N. J.
Seneca Wire & Mfg. Co., The, Fostoria, O.
Wickwire Bros., Cortland, N. Y.

WIRE—Insulated
American Steel & Wire Co. (U. S. Steel
Corp. Subsidiary), Chicago.

Roebling's, John A., Sons Co., Trenton, N. J.

WIRE—Mattress
Roebling's, John A., Sons Co., Trenton, N. J.

WIRE—Netting
Roebling's, John A., Sons Co., Trenton, N. J.
Wickwire Brothers, Cortland, N. Y.

WIRE—Piano and Music
Webb Wire Works, New Brunswick, N. J.

Wickwire Spencer Steel Co., 41 East 42nd
St., N. Y. C.

WIRE—Rustless
Rustless Iron & Steel Corp., Baltimore, Md.

WIRE—Special Drawn Shapes
Rathbone, A. B. & J., Palmer, Mass.

WIRE—Spring
American Steel & Wire Co. (U. S. Steel
Corp. Subsidiary), Chicago.
Barnes, Wallace Co., The, Div. of Asso-
ciated Spring Corp., Bristol, Conn.
Columbia Steel Co. (U. S. Steel Corp.
Subsidiary), San Francisco, Calif.
Jones & Laughlin Steel Corp., Pittsburgh,
Pittsburgh (Pa.) Steel Co.
Roebling's, John A., Sons Co., Trenton, N. J.
Seneca Wire & Mfg. Co., The, Fostoria,
Ohio.

WIRE—Spring (Music)
Webb Wire Works, New Brunswick, N. J.

WIRE—Stainless Steel
Page Steel & Wire Div., American Chain
& Cable Co., Inc., Monessen, Pa.
Rustless Iron & Steel Corp., Baltimore,
Md.
Webb Wire Works, New Brunswick, N. J.

WIRE—Steel
Bethlehem (Pa.) Steel Co.
Prentiss, Geo. W., & Co., Holyoke, Mass.
Wickwire Brothers, Cortland, N. Y.

WIRE—Welding
Air Reduction Sales Co., 60 East 42nd
St., N. Y. C.
American Steel & Wire Co. (U. S. Steel
Corp. Subsidiary), Chicago.
Lincoln Electric Co., The, Cleveland.
Maurath, Inc., 7400 Union Ave., Cleveland.
Page Steel & Wire Div., American Chain
& Cable Co., Inc., Monessen, Pa.
Pittsburgh (Pa.) Steel Co.
Revere Copper & Brass, Inc., 230 Park
Ave., N. Y. C.
Roebling's, John A., Sons Co., Trenton, N. J.
Seneca Wire & Mfg. Co., The, Fostoria,
Ohio.
Una Welding, Inc., Cleveland, Ohio.
Wickwire Brothers, Cortland, N. Y.
Wickwire Spencer Steel Co., 41 East 42nd
St., N. Y. C.

WIRE—Zinc
Platt Bros. & Co., The, Waterbury, Conn.

WIRE CLOTH
Buffalo (N. Y.) Wire Wks. Co., Inc.
Roebling's, John A., Sons Co., Trenton, N. J.
Wickwire Bros., Cortland, N. Y.
Wickwire Spencer Steel Co., 41 East 42nd
St., N. Y. C.

WIRE DRAWING MACHINERY—See
Wire Mill Machinery & Equip.

WIRE FORMING MACHINERY
Baird Mch. Co., The, Bridgeport, Conn.
Manville, E. J., Mch. Co., Waterbury, Ct.
Nilson, A. H., Mch. Co., Bridgeport, Ct.
Sleeper & Hartley, Inc., Worcester, Mass.
U. S. Tool Co., Inc., Ampere, N. J.

WIRE MILL MACHINERY AND
EQUIPMENT
Morgan Construction Co., Worcester, Mass.
Sleeper & Hartley, Inc., Worcester, Mass.
Torrington (Conn.) Mch. Co., The
Waterbury (Ct.) Parrel Fdry. & Mch. Co.,
The.

WIRE NAIL MACHINERY
Sleepers & Hartley, Inc., Worcester, Mass.

WIRE PRODUCTS
American Spring & Mfg. Corp., Holly,
Mich.

AMERICAN STEEL & WIRE CO. (U. S. STEEL
CORP. SUBSIDIARY), Chicago.
Buffalo (N. Y.) Wire Wks. Co., Inc.
Eastern Tool & Mfg. Co., Bloomfield, N. J.
Hindley Mfg. Co., Valley Falls, B. L.
Pittsburgh (Pa.) Steel Co.
U. S. Steel Wire Spring Co., Cleveland, O.
Wickwire Bros., Cortland, N. Y.
Wickwire Spencer Steel Co., 41 East 42nd
St., N. Y. C.

WIRE ROPE
American Steel & Wire Co. (U. S. Steel
Corp. Subsidiary), Chicago.
Columbia Steel Co. (U. S. Steel Corp.
Subsidiary), San Francisco, Calif.
Seneca Wire & Mfg. Co., The, Fostoria, O.
Wickwire Bros., Cortland, N. Y.

WIRE ROPE FITTINGS
Roebling's, John A., Sons Co., Trenton, N. J.

WIRE STRAIGHTENING AND CUTTING
MACHINERY—Automatic
Shuster, F. B., Co., The, New Haven, Ct.

WRENCHES
Armstrong Bros. Tool Co., Chicago.
Billings & Spencer Co., Hartford, Conn.
Williams, J. H., & Co., Buffalo, N. Y.

WRENCHES—PIPE
Greenfield (Mass.) Tap & Die Corp.

WRENCHES—PNEUMATIC
Ingersoll-Rand Co., 11 Broadway, N. Y. C.

ZINC—SLAB (Spelter)
New Jersey Zinc Co., The, 160 Front St.,
N. Y. C.

ZINC—STRIP
Platt Bros. & Co., The, Waterbury, Conn.
ZINCIRCONIUM METAL & ALLOYS
Electro Metallurgical Sales Corp., 30 E.
42nd St., N. Y. C.

STAINLESS WIRE

THE
WEBB WIRE WORKS

NEW BRUNSWICK, N. J.
BOX 589

WIRE IRON STEEL

All Sizes Finishes

THE SENeca WIRE & MFG. CO. FOSTORIA, O.

zinc

WIRE STRIP, COILED FOR FUSE ELEMENTS

EYELETS ALSO BRASS or STEEL

THE PLATT BROS. & CO., WATERBURY, CONN.

THE CLEARING HOUSE

CONSIDER GOOD USED EQUIPMENT FIRST

IMMEDIATE AVAILABILITY AND DELIVERY ARE IMPORTANT FACTORS

AIR COMPRESSORS

138 cu. ft. 8"x 8" Chicago Pneumatic Class NSB
253 cu. ft. 10"x 10" Chicago Pneumatic Class NSB
1309 cu. ft. 22"x 13"x 16" Ingersoll-Rand Class 10B2
1573 cu. ft. 22"x 13"x 14" Sullivan Class WN3
2678 cu. ft. 28"x 17 1/2"x 21" Ingersoll-Rand Class PRE2

BENDING ROLLS

10' Ryerson, Belt Driven, 1/2" Capacity
10' McCabe, Arr. for M.D. 1/2" Capacity
10' Bertsch, Belt Driven, 1/2" Capacity
20' Wilkes, Arr. for M.D. 1/2" Capacity
24' Hillies & Jones, M.D. 1/2" Capacity
30' Hillies & Jones, No. 8. Arranged for Motor Drive. Capacity 1" Plate

DRAW BENCH

50 ton Cooper Seamless Tube Cold Draw Bench
25' Draw

FORGING MACHINES

2 1/2", 3", 3 1/2", 5" Ajax Steel Frame
5" JAX HEAVY DUTY NEW MODEL TWIN GEAR, TOP SUSPENDED HEADERS SLIDE, MOTOR BRACKET
2", 5" National Steel Frame

HAMMERS—BOARD DROP—STEAM DROP—STEAM FORGING

Chambersburg, Niles-Bement-Pond, Erie and Billings & Spencer 1200 lb. to 12,000 lb.

HEATER

American Car & Fdry. Co. "Berwick" Electric Metal Heater Type D, Size 3-5. Capacity 1" Rivets

LEVELLERS

40' Hillies & Jones, Motor Driven, Capacity 1/2"
50' National 17 Roll, 3 1/2" diameter rolls
60' National 17 Roll, 4 1/2" diameter rolls
60' Newbold 11 roll, Arranged for Motor Drive. Capacity 3/16" Plate

PIPE MACHINE

12" Saunders Pipe Cutting & Threading Machine, Motor Driven, Capacity 8" to 12"

PLATE EDGE PLANERS

No. 4 Hillies & Jones Motor Driven. Distance between housings 28". Diameter of Screw 6". Capacity 1 1/2" plate 20' long. Equipped with pneumatic hold down
10' Niles, Belt Driven. Distance between housings 11' 9". Capacity 1/2" Plate

Pittsburgh Office
710 Park Bldg.

Manufacturing

Confidential Certified Appraisals
Liquidations—Bona Fide Auction Sales Arranged—Entire or Surplus Mfg. Equipment Inventories Purchased

52" Gisholt Vertical Boring Mill, rapid traverse.
20" x 8' Springfield GH Lathe, 12 speed ballbearing head, M.D.
30" x 16' LeBlond Lathe, cone head, T.A.
No. 2 Mitts & Merrill Keyseater.
2 x 24" J. & L. Steel Head Flat Turret Lathe, M.D.
No. 13 B. & S. Universal Tool & Cutter Grinder, B.D.
16" Gould & Eberhardt Shaper, cone drive.
24" Gould & Eberhardt Shaper, gear box AC drive.
No. 1 Kempsmith Universal Miller, full equipment.
4-spindle Allen Drill, power feed to each spindle, M.D.

BUFFALO MACHINERY CO., INC.
839 Grant Street Buffalo, N. Y.

44-inch Putnam Boring Mill
Barrett Typhoon Oil Extractor, motor-dr.
Two National Computing Scales
Kingsbury Automatic Drill Press
Foote-Burt 4-spindle Drill Press
Nasco Drill arr. for 12 spds., 16x20 round head

Pratt & Whitney Thread Miller

THE ELYRIA BELTING & MACHINERY CO.
ELYRIA, OHIO

6 sp. N.B.-GRIDLEY AUTOMATIC 1 1/4" x 7". New 1930. M.D.
60" COLBURN VERT. BORING MILL Power rapid traverse. S.P.D.
KENNARD & WILLIAMS, INC.
114 Liberty St. New York City

PRESS—HYDRAULIC WHEEL

600 ton Niles-Bement-Pond, 45" Between Parallel Bars. Distance of ram 17". Motor Driven

PRESSES—STRAIGHT SIDE

No. 960 Toledo, 24" Stroke, 148" Between Uprights
No. 78 1/2 Bliss 10" Stroke, 36" Between Uprights
No. 151 Ferrocute, 12" Str., 32" Between Uprights
No. 304 Bliss, 4" Stroke, 18" Between Uprights

PRESSES—TOGGLE DRAWING

No. 412 Bliss, 86" Between Uprights
No. 1018 Bliss, 60" Between Uprights
No. 408 Bliss, 60" Between Uprights
No. 13 Bliss, Double Geared, 300 ton Capacity

19 OVERHEAD ELECTRIC TRAVELING CRANES—ALL IN ONE PLANT

Various Makes, Capacities and Spans. Complete with 230 Volt D.C. Motors and Controls. Single and Double Hook. Single and Double Trolleys. Building to be dismantled and Cranes must be removed promptly.

Priced low for immediate disposition.

All are in first class operating condition.

NUMEROUS OTHER CRANES AVAILABLE IN VARIOUS CAPACITIES AND SPANS, BOTH A. C. and D. C.

GANTRY CRANES

35 ton McMyler Steam (Oil Fired) Traveling Crane 70' Boom, 15' Between Legs, 22' Portal Link Belt, 2 Yard Steel Traveling Crane 100' Span 40' Cantilever, 45' Lift, 150' Length Overall

PRESSES—HYDRAULIC

450 ton Birdsboro 4-Column Flanging Press, 8"x12' Between Columns, 10' Daylight

500 ton Birdsboro 4-Column Vertical, 48"x48" Between Columns, 8' Daylight

1200 ton Southwick 4-Column Forging Press, 36"x 48" Between Columns, 82" Daylight

PUNCH & SHEAR COMBINATION

No. 0 Buffalo Armor Plate Universal. Capacities: Punch, 11/16" x 1/2" & 3/4" x 3/4"; Shear Plates, 1/2"; Flats, 4x5/8"; Rounds, 1 1/4"; Squares, 1 1/8"; Angles, 3" x 3" x 3/8"

PUNCH & SHEAR COMBINATION

No. 1/2 Buffalo Armor Plate Universal. Capacities: Punch, 1" x 1 1/2" & 7/8" x 5/8"; Shear Plates, 1 1/2"; Flats, 6" x 5/8"; Rounds, 1 1/4"; Squares, 1 1/2"; Angles, 4" x 4" x 1 1/2"

TESTING MACHINES

30,000 and 50,000 lb. Riehle Bros. Universal, Motor Driven

150,000 lb. Riehle Bros. Three Screw Universal, Motor Driven. With Autographic Recorder

WIRE DRAWING MACHINES

Aetna, Belted Motor Drive. Capacity 1 1/2" diameter

Aetna No. 102, Double Bearing, Belted Motor Drive. Capacity 1 1/4"

RITTERBUSH & COMPANY, INC.

30 CHURCH ST., NEW YORK, N. Y.

Telephone Cortlandt 7-3437-3438

ROLLING MILLS

8" x 4 1/2" Blake & Johnson Single Stand 2 High
4" x 5" Turrington Single Stand Two High

8 1/2" x 10" Belgian Three Stand Two High

9" x 10" Columbia Two Stand 2 and 3 High

10" x 12" Columbia Two Stand 2 and 3 High

12" x 15" Single Stand Two High Finishing Mill

Macintosh Hemphill Single Stand 2 High

12" x 16" Phila. Single Stand Two High

14" x 24" Hill Clutch Two Stand Two High

15" x 38" Waterbury Farrel Single Stand 3 High

Rod Mill, Motor Driven, Capacity

Round Bars 1 1/2" down to 1/4"

20" x 20" Birmingham Two Stand Two High

22" Lewis Three High Bar Mill, Complete with electric driven feed and tilting tables, runout tables, bull head electric driven thru Fawcett Gear

electric driven pusher for cooling table

Train of 30" dia. Two High Hot Sheet Mills. Complete with Hot Mill Drive Motors, Regulators, Controls, Speed Reducers

ROLL—LATE STRAIGHTENING

Hills & Jones. Arranged for Motor Drive. Six

Rolls 13 1/2" dia. 10' 6" Between Housings. Capacity 1" plate

SHAR—GUILLOTINE TYPE

Garrison Bar Shear Arranged for Motor Drive.

Length of Blade 9 1/16". Capacity 5" Rounds

STRAIGHTENERS

No. 0 MEDART Straightening, Polishing & Sizing Machine, Multiple V Belt Drive. Timken Roller Bearing. Capacity Bars 1/2" to 1 1/2" dia. Incl. any length. Installed New July 1937

No. 1 Sutton-Abramson Round Straightening Machine. Capacity Bars 3/8" to 1 1/2" dia. Tubes 3/8" to 2" O.D.

TESTING MACHINES

30,000 and 50,000 lb. Riehle Bros. Universal, Motor Driven

150,000 lb. Riehle Bros. Three Screw Universal, Motor Driven. With Autographic Recorder

WIRE DRAWING MACHINES

Aetna, Belted Motor Drive. Capacity 1 1/2" diameter

Aetna No. 102, Double Bearing, Belted Motor Drive. Capacity 1 1/4"

Pittsburgh Phone
Atlantic 1208

Consulting Engineering Service
Equipment Inventories Purchased

AUTOMATICS

100% Rebuilt for Immediate Delivery

—3 1/2" Four Spindle Model B Aetna

—1 1/2" Four Spindle Cone

—No. 652 New Britain

—No. 654 New Britain

—No. 452 New Britain

—No. 454 New Britain

—No. 33 New Britain

—1/2" Model L. S. S. Gridley

—1/2" Model G. Gridley

—2" Model H Gridley Chuckers

—2 1/2" Model A Cleveland

—2 1/2" Model A Cleveland

—2 1/2" Model B Cleveland

—Four Spindle Cleveland Nut Machines

—1 1/2" x 18" Cleveland Shaft Machines

—2 1/2" x 18" Cleveland Shaft Machines

Over sixty automates in stock—Cones, Gridleys, New Britains and Clevelands

MISCELLANEOUS

—No. 12 Brown & Sharpe Miller

—Briggs Automatic Miller, table 6"x12"

—36" Bausch Vertical Mill, two heads

—Beaman Smith Vertical Miller, table 54"x27"

—45 HP Ridgeway Steam Engine, with 25 KW

DC Thompson Ryan Dynamo

Collets and Pushers for 7/8", 1 1/4", 2", 2 1/2", and

2 3/4". Models A, B, C and M Clevelands

Collets and Pushers for 9/16", 7/8", 1", 1 1/4", 1 1/2",

1 1/4", 1 1/2", 2", 2 1/2", 3/4", 4", 4 1/2" and 5" Models

G, F, C, J and L Gridleys

Collet Pads and Pusher Pads for 1 1/4", 1 1/2", 2",

2 1/2", 3/4", 4", 5" and 5 1/4" Models F, G, C, J

and L Gridleys

Collet Pads and Pusher Pads for 2", 2 1/2", 2 3/4"

Models A, B, C and M Clevelands

Collets and Pushers and Pads for 515, 52, 53, and 55

Acme

100 Tons of new repair parts for Clevelands and

Gridleys

200 Emery Wheels for 12" P&W Vertical Grinders.

Also 30,000 left hand drills

—100" x 10" Bausch Vertical Mill

—100" x 12" Bausch Vertical Mill

—100" x 14" Bausch Vertical Mill

—100" x 16" Bausch Vertical Mill

—100" x 18" Bausch Vertical Mill

—100" x 20" Bausch Vertical Mill

—100" x 22" Bausch Vertical Mill

—100" x 24" Bausch Vertical Mill

—100" x 26" Bausch Vertical Mill

—100" x 28" Bausch Vertical Mill

—100" x 30" Bausch Vertical Mill

—100" x 32" Bausch Vertical Mill

—100" x 34" Bausch Vertical Mill

—100" x 36" Bausch Vertical Mill

—100" x 38" Bausch Vertical Mill

—100" x 40" Bausch Vertical Mill

—100" x 42" Bausch Vertical Mill

—100" x 44" Bausch Vertical Mill

—100" x 46" Bausch Vertical Mill

—100" x 48" Bausch Vertical Mill

—100" x 50" Bausch Vertical Mill

—100" x 52" Bausch Vertical Mill

—100" x 54" Bausch Vertical Mill

—100" x 56" Bausch Vertical Mill

—100" x 58" Bausch Vertical Mill

—100" x 60" Bausch Vertical Mill

—100" x 62" Bausch Vertical Mill

—100" x 64" Bausch Vertical Mill

—100" x 66" Bausch Vertical Mill

—100" x 68" Bausch Vertical Mill

—100" x 70" Bausch Vertical Mill

—100" x 72" Bausch Vertical Mill

—100" x 74" Bausch Vertical Mill

—100" x 76" Bausch Vertical Mill

—100" x 78" Bausch Vertical Mill

—100" x 80" Bausch Vertical Mill

—100" x 82" Bausch Vertical Mill

—100" x 84" Bausch Vertical Mill

—100" x 86" Bausch Vertical Mill

—100" x 88" Bausch Vertical Mill

—100" x 90" Bausch Vertical Mill

—100" x 92" Bausch Vertical Mill

—100" x 94" Bausch Vertical Mill

—100" x 96" Bausch Vertical Mill

—100" x 98" Bausch Vertical Mill

—100" x 100" Bausch Vertical Mill

—100" x 102" Bausch Vertical Mill

—100" x 104" Bausch Vertical Mill

—100" x 106" Bausch Vertical Mill

—100" x 108" Bausch Vertical Mill

—100" x 110" Bausch Vertical Mill

—100" x 112" Bausch Vertical Mill

—100" x 114" Bausch Vertical Mill

—100" x

THE CLEARING HOUSE

USED MACHINERY

That operates Like New

BORING MILLS—Horizontal and Vertical

N.B.P. No. 11 $\frac{1}{2}$ portable, 3 $\frac{1}{2}$ " bar horiz.
BEAMAN & SMITH 5" bar horiz.
BULLARD 24" vert.
BULLARD 42" New Era Type vert.
N.B.P. 42" 44", 51", 52" vert.
COLBURN 54" 2 swivel hds. vert.
POND 90", 2 hds. vert.
NILES 10" vert.

PLANERS

CLEVELAND 48" x 48" x 16"; 4 heads openside
AMERICAN 36" x 36" x 20"; 3 hds.
CINCINNATI 36" x 36" x 12"; 2 hds.
N.B.P. 48" x 48" x 16"; 4 hds.

LATHES

NILES BEMENT POND 46" x 15", Q.C.G.
PITTSBURGH 36" x 28", grd. hd.
PUTNAM 36" x 28", 3 step cone, DBG.
PUTNAM 36" x 28", grd. head—Nearly New
BRIDGEFORD 36" x 60" comb. boring and turning
BRIDGEFORD 36" x 60" boring
MC CABLE 27-49" x 6" Double Spindle
LODGE & SHIPLEY 24" x 10" cone dr.
GREAVES & KLUSSMAN 16" x 8" motor-in-base
PRATT & WHITNEY 16" x 8" grd. hd. toolroom.

MILLING MACHINES
BROWN & SHARPE No. 1 Vert.
CINCINNATI 24", 48" Automatic
INGERSOLL No. 3 Combined heavy duty Vert.
INGERSOLL 24" x 24" x 12", planer type
INGERSOLL 24" x 24" x 12", slab
NEWTON No. 2 Ver. spade. keyseat
BROWN & SHARPE No. 4 Universal cone dr.
CINCINNATI Nos. 2, 3, 4 Plain
LEES BRADNER No. 4 thread
PRATT & WHITNEY No. 4 1/2 x 12, 6x48, 6x80 thread
BECKER C-1 and C Vertical
BROWN & SHARPE No. 1Y Plain; latest type
KEARNEY & TRECKER No. 1B Vert. P.R.T.

42" BULLARD New Era Type Vertical Turret Lathe— side head, cutting lubricant system

DRILL PRESSES

NATCO No. 12, No. 13, No. 22 Multiple spade.
NATCO C11 Drill—mechanical feeds.
NATCO C13H Drill—hydraulic feeds
PRATT & WHITNEY No. 12 rect. head

DRILLS—RADIAL

AMERICAN 3", 5" triple purpose
CINCINNATI BICKFORD 5" full Univ.
DRESSES 3" and 5" PI. SPD.
REED PRENTICE 4" PI.

GEAR CUTTING EQUIPMENT

BROWN & SHARPE No. 4, 48" Gear Cutter
BARBER & COLMAN Nos. 3 and 12 Gear Hobbers
GOULD & EBERHARDY 18", 36" Hobbers
CLEVELAND 18" Spine Hobber
GLEASON 15" Spiral Bevel Gear Finisher
GLEASON 10" Spiral Bevel Gear
FELLOWS No. 8B Burnisher
FELLOWS Nos. 6, 61, 615
FELLOWS Nos. 7, 71
LEES BRADNER Lapper, cap. 1 $\frac{1}{4}$ " x 8"

GRINDERS

BRYANT No. 3 Internal
PERSONS ARTER 12" Rotary surf.
HEALD Nos. 50, 55, 60, 65 intl.
HEALD No. 72 Hydr.; 72-A-3 Sizematic
LANDIS 10x24, 10x36, 10x72
DIAMOND 48" typ H Surf.
NORTON type B81 14x30x36" crankpin
DIAMOND 84" Face
PRATT & WHITNEY No. 14 surface

MISCELLANEOUS

FOSTER No. 1B, No. 3B Univ. Turret Lathe
BROWN & SHARPE No. 2F, No. 6F Screw Mach.
CLEVELAND 3/4"; 2-2 $\frac{1}{2}$ "; 2 $\frac{1}{2}$ -2 $\frac{3}{4}$ " Model "A"
TREADWELL 12" pipe mach.
LIBBY 18" model "A", 26"—7 $\frac{1}{2}$ " hole
LYND FARQUHAR 26" Shaper sgle. hd.
PRATT & WHITNEY No. 12 Profiler, grd.
GLEASON 12" Cutter Sharpener
REED PRENTICE No. 3 vert. die sinker, late type
ACME 2" all steel Upsetter
NAZEL No. 2B Hammer
TOLEDO No. 5/2 D.C. Power Press
HENRY & WRIGHT 50 ton Die Press

ask for details
1000 other machines in stock

MOREY
MACHINERY CO., INC.
410 BROOME ST. NEW YORK

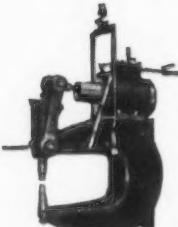
UNUSUAL TOOLS

AUTOMATICS. Nos. 454 & 654 New Britain
AUTOMATIC. 10" Bullard Continumatic
BROACH. No. 3 Oilgear hydraulic
COMPRESSOR. 550" National vertical
DIAMOND BORER. 2 spdl. Coulter
DRILL. 6" Niles Bement Pond universal
DRILL. Nos. 216, 217, 315, 321 Baker
DRILL. 6 spdl. P. & W. deep hole hydraulic
GEAR SHAPER. No. 715 Fellows high speed
GRINDER. No. 2 Cincinnati centerless
GRINDER. Nos. 18 & 221 Badger opposed disc
GRINDER. 26" No. 16 Blanchard surface
HAMMER. 16" x 10" S. geared head
HATTE. 16" x 8" & 10" L. S. geared head
LATHE. TURRET. 24" Bullard New Era
MILL. BORING. 42" King, 1 plain, 1 turret
head
BILL. BORING. 60" Gisholt
MILLER. No. 3 Cincinnati, rect. overarm
MILLER. Nos. 2, 3B & 4B Brown & Sharpe
MILLER. UNIV. Nos. 2 & 3A Hvy. B. & S.
MILLER. VERT. No. 2 Brown & Sharpe
MILLER. AUTO. 24" & 48" Cincinnati
MILLER, MFG. Nos. 13B & 33 Brown & Sharpe
MILLER. ROTARY. 24" & 48" Newton
MILLER. OFFSET. 48" Ohio
MILLER. DUPLEX. 24" Cincinnati
MILLER. HAND. Nos. 1 & 2 Kent Owens
PLANER. 24" x 24" 6" Liberty openside
PLANER. 30" x 30" x 12" Cleveland openside
PLANER. 36" x 36" x 12" Cleveland openside
PLANER. 48" x 36" x 12" Liberty openside
PRESS. No. 21 $\frac{1}{4}$ Bliss OBI geared
PRESS. No. 5 1/2" x 10" OBI geared
PRESS. Nos. 35 $\frac{1}{2}$ & 50 $\frac{1}{2}$ Toledo
PRESS. Nos. 64, 85 & 86 Consolidated
PRESS. 60" ton Cleveland coining
PRESS. 72" No. 3G Bliss double crank
PRESS. Nos. 1 $\frac{1}{2}$ B & 5A Bliss toggle
PRESS. No. 75 Toledo geared
PRESS. Nos. PG4 & PG5 Ferratec
ROLLS. No. 1A McKay 19 roll leveling
ROLLS. 48" McKay 19 roll leveling
SAWS. 6" x 6" & 8" x 8" Racine hack
SHAPER. 24" Pottel & Johnson
SHEAR. 34", No. 1 Gray
SHEAR. 48" x 3 $\frac{1}{2}$ " Niagara squaring
SHEAR. 10" x 16" ga. Bertsch squaring
SLOTTER. 20" Betts, MD. PRT
TAPPER. Nos. 1, 2, 2X, 2BG Garvin
THREADER. 1", 1 $\frac{1}{2}$ ", & 2" Landis double
THREADER. 2" & 3" Acme, style A
UPSETTERS. 1", 1 $\frac{1}{2}$ ", 4" & 5" Ajax
UPSETTER. 1 $\frac{1}{2}$ Acme
WELDER. 300 amp. Lincoln arc
WELDER. 100 KVA Thompson Spot
WELDER. 47 KVA Taylor spot
WELDER. 20 KW Federal spot

2000 TOOLS IN STOCK. SEND FOR LIST.

MILES
MACHINERY COMPANY
SAGINAW, W.S.
MICHIGAN

RIVETERS



| | | | | | | |
|--------|--------|-------|--------|-----|-----|----------|
| 70-ton | Hanna, | 36" | reach, | 20" | gap | \$550.00 |
| 70 | " | 24" | " | 18" | " | 475.00 |
| 65 | " | Allen | 66" | " | 15" | 425.00 |
| 50 | " | Hanna | 36" | " | 18" | 450.00 |
| 50 | " | " | 25" | " | 15" | 375.00 |
| 50 | " | " | 102" | " | 15" | 675.00 |
| 30 | " | " | 18" | " | 15" | 175.00 |
| 30 | " | " | 8" | " | 8" | 150.00 |
| 30 | " | Allen | 36" | " | 16" | 250.00 |
| 30 | " | " | 8" | " | 8" | 150.00 |
| 20 | " | Hanna | 30" | " | 20" | 250.00 |

All of the above riveters located in our Chicago stock, reconditioned, ready for immediate service.

We also have various sizes Berwick Electric Rivet Heaters available.

LOUIS E. EMERMAN & CO.
1761 ELSTON AVE.
CHICAGO, ILL.

60" x 60" x 14"

NILES-BEMENT-POND PLANER
3 heads—rapid traverse—box table—forced lubrication—reversing motor drive.

Like New

BUFFALO MACHINERY CO., INC.
839 Grant St.
Buffalo, N. Y.

SPECIAL OFFERINGS

5' American Triple Purpose Plain Radial Drill
No. 2-B Foster Universal Timken Bearing Turret
Lathe
No. 1-B Foster Universal Turret Lathe
2" Landis Double Head Motor Drive Bolt Threader, like new
24" x 14" Chard Lathe.
20" x 12" Ryerson Geared Head Lathe, M. D.
No. 5 Bliss Solid Back Punch Press, M. D.
No. 8 Buffalo Bar Cutter, 95% New
51" Niles Vertical Boring Mill.

THE E. L. ESSLEY MACHINERY CO.
829 W. Evergreen Ave., Chicago, Illinois

1—14" x 6' Hendey Lathe, cone type

3—2 $\frac{1}{4}$ " Single Spindle Gridley Automatics

D. E. DONY MACHINERY CO.
47 LAURELTON ROAD ROCHESTER, N. Y.

26" x 120" LANDIS GRINDER

Self Contained — Motor Drive

ROSENKRANZ WEISBECKER & CO., INC.
149 BROADWAY, N. Y. C.

INGERSOLL-RAND 2 STAGE AIR COMPRESSOR
—TYPE XRB—7x10 and 11x10—Complete with
Motor
Nos. 4 & 6 WARNER SWASEY HAND SCREW
MACHINE
30" x 12" AMERICAN—16" x 8" LODGE & SHIPLEY
ENGINE LATHES, Cone Drive with Taper attachment
10", 20", 24", 28", 30" GOULD & EBERHARDT SHAPERS,
SINGLE PULLEY DRIVE AND CONE
DRIVE
Nos. 70 & 75 HEALD INTERNAL GRINDERS
AVEY BALL BEARING DRILLS, 1, 2, 3 spindles
No. 2, 3 CINCINNATI MILLERS—PLAIN & UNI-
VERSAL CONE DRIVE
No. 2 DIAMOND SURFACE GRINDER
PARTIAL LIST — SEND US YOUR INQUIRIES.

**INDIANAPOLIS MACHINERY
& SUPPLY CO., INC.**
1959-69 South Meridian Street, Indianapolis, Indiana

THE CLEARING HOUSE

Investigate HILL-CLARKE MACHINE TOOL OPPORTUNITIES

BORING MACHINES

5" N-B-P Floor Type
5" Newton Portable
4 1/2" Hamilton Floor Type
3 1/2" Rochester Floor Type
3" No. 2 Rochester
3" No. 3A Universal
2 1/2" No. 1 Cleveland

No. 4-48" B. & S.
No. 6-60" B. & S.
No. 2-50" Goss Hobber
No. 6-72" B. & S.
11" Gleason Bevel
Nos. 6, 61, 62 Fellows
Nos. 65, 615, 625 Fellows
12" x72" G. & E. Rack Cut-
ter
96" Newton, M.D.

BORING MILLS

24", 36" Bullard "New Era"
24" Bullard "Rap. Prod."
42" Bullard "New Era"
30", 52", 62" King
48", 54", 60" Colburn

GRINDERS
NORTON Motor Driven—
nearly all sizes
26" x16" Landis Plain
26" x96" Landis Plain
No. 2 B. & S. Univ.
12" x66" Landis Univ.
No. 70 Head Int.
No. 10 Blanchard
No. 16-A Blanchard
Landis Crankpin Grdr.
16" Arter Rotary Surf.
14" x36" P. & W. Surf.
Norton Open Side Surface

DRILLS

1, 2, 3 spdl. Lel.-Gifford
4, 6 spdl. Lel.-Gifford
1, 2, 3 spdl. H. & W.
4, 6 spdl. Henry & Wright
32" Cinn. Bickford
No. 210 Barnes, 1 spdl.
No. 210 Barnes, 3 spdl.
No. 2 Colburn, 2 spdl.
No. 2 Colburn, 3, 4 spdl.
No. 3-24" Defense
Nos. 121, 314 Baker
No. 25-36" Foote-Burt
No. 22-Western Multiple
No. 12-C Fox Multiple
No. 14 Nato Multiple
No. 4 Baush Multiple

LATHES
14" x 6" Lodge & Shipley
14" x 8" American
16" x 8" American
16" x 8" Lodge & Shipley
18" x 8" American
18" x 8" Lodge & Shipley
20" x 8" Lodge & Shipley
20" x14" L. & S. Grd. Hd.
22" x12" Lodge & Shipley
24" x12" L. & S. Grd. Hd.
26" x14" LeBlond Crank
30" x11" American Grd. Hd.
30" x10" American
36" x30" Rahn-Larmon
54" x22" Johnson
66" x21" Putnam

RADIALS

3" Carlton Sensitive
5" American Full Univ.
5" American Triple Purpose
6" American Triple Purpose

GEAR CUTTERS
Nos. 2, 3, 12 Barber-Colman
No. 1/2" Pfauter Hobber
No. 18-H G. & E.
No. 16-HS G. & E.
No. 3-26" B. & S.

MILLERS

No. 0Y Brown & Sharpe
No. 24 Hwy. Ogle

CINCINNATI PLAIN HYDROMATIC MILLER



No. 5-48" CINCINNATI HYDROMATIC MILLER

ARRANGED MOTOR DRIVE, ONE WAY

FEED CYCLE, SPINDLE REVERSE,

AUTOMATIC SPINDLE STOP, AUTOMATIC LUBRICATION,

VARIABLE FEED ATTACHMENT.

HILL-CLARKE MACHINERY CO. 647 WASHINGTON BLVD.

CHICAGO, ILL.

FORGING MACHINE

1 1/2" Acme All Steel, 8" stroke, for motor drive. Weight 18,000 lbs. Used very little. Fine condition. Attractive price.

PRESSES

95-E Toledo D.C., D.B.G. Tie-Rod, 10" stroke, 85" betw. housings, friction clutch. Spring knockout, for motor drive. In excellent condition.

59 1/4 Toledo S.C., D.B.G. Tie-Rod, bed 40x40", 8" stroke, Fctn Clutch, B.D., Good.

78 1/2 Bliss S.C., D.B.G., Tie-Rod, 10" stroke.

77 1/2 Bliss S.C., D.B.G., Tie-Rod, 8" stroke, with Marquette Cushions.

57 Toledo S.C., D.B.G., 16" stroke, bed 24" x24", Friction Clutch, for belt drive.

MARR-GALBREATH MACHINERY CO.

55 Water Street, PITTSBURGH, PA.

I Bliss No. 50 Geared Power Press.
I Bliss No. 3/2 Toggle Drawing Press.
I Ferracut No. EG-54 Knuckle Joint Press.
I Pels No. 16 Combination Iron Worker, motor driven.
I Blake & Johnson 12" x 12" Cold Rolling Mill.
I Shuster Wire straightening & cutting machines.
I Baird No. 1, No. 2 & No. 3 four slide wire machines.
I Cleveland Double Crank Power Press, 6" stroke.

NATIONAL MACHINERY EXCHANGE
128-138 Mott St. New York, N. Y.

Brake, 10' x 10 ga. Ohi, press type
Bulldozer, No. 9 Williams-White
Gang Slitter, Braddock, 36" x 11 gauge
Press, No. 58 Toledo S.S., grd., 35,000 lbs.
Presses, Nos. 6 & 7A Niagara, Ohi, grd.
Shear, No. 2120 Niagara, 10' x 14 ga.
RELIANCE MACHINERY SALES COMPANY
1403 Brighton Place, N.S., Pittsburgh, Pa.

No. 95E TOLEDO DOUBLE CRANK
PRESS, Ram 74" x 9", tie rod
No. 59 1/4 TOLEDO S.S. TIE ROD
PRESS

EMBOSSING PRESSES, 400 and 600 Ton
DOUBLE ANGLE SHEARS: Kling 6" x6"
x1" 8" x8" x1"

BULLDOZERS: Nos. 1 to 26, No. 24 Vert.
UPSETTING and FORGING MA-
CHINES: 1" to 5"

5000 LB. ERIE DOUBLE FRAME
FORGING HAMMER

No. 5B NAZEL HAMMER, Belt Drive,
Cap. 6" sq.

BUFFALO BAR SHEAR: No. 8 for

Rounds, Flats and Structural shapes

400 TON WHEEL PRESS

PRESSES: Solid Back, Incl. and Trimming
STRUCTURAL MACHINERS: Punches,
etc.

TENSILE TESTERS: 20,000, 40,000 and
200,000 lb.

THREADING MACHINES: 1/2" to 4"

Single and Double Spindle, lead screws

D & K BENDING BRAKES: 10' x 1/2";

10' x 16 ga. pan

NIAGARA SHEAR: 10' x 18 ga.

YODER SLITTER: 36" x 16 ga.

BOLT, NUT and RIVET MACHIN-
ERY: Headers, Trimmers, Thread Rollers,
Slotters, Stud Threaders, Tappers, Burring
Machines, etc.

DONAHUE STEEL PRODUCTS CO.

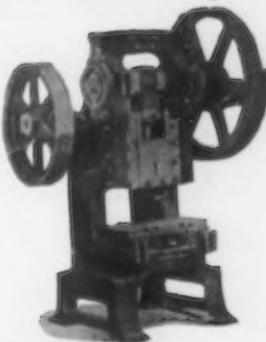
74th St. & Ashland Ave. Chicago, Ill.

GAPFRAME PRESS

BRAND NEW

SAVE \$1,000.00

Immediate Shipment



78 TOLEDO GEARED

Complete with motor

New Cost \$2250.00

Our Price \$1250.00

f. o. b. Philadelphia

Ram Pressure 105 tons

Weight 17,500 lbs.

Stroke 5"

Bed Area 20 x 37 1/2"

Distance ram to bed,

stroke down, adj. up 1 1/4"

J. N. MOYER

471 No. 5th St. Philadelphia, Pa.

POWER PRESSES

BLISS, TOLEDO, V & O, ETC.

REBUILT—GUARANTEED

JOSEPH HYMAN & SONS

12th, Livingston and Almond Streets
Philadelphia, Pa.

THE CLEARING HOUSE

BULLDOZERS

No. 27 WILLIAMS & WHITE
16"x70" crosshead

No. 7 AJAX
16"x70" crosshead

No. 7 BLAKESLEE
14"x65" crosshead

No. 6 WILLIAMS & WHITE
12"x68" crosshead

No. 7 AJAX
12"x65" crosshead

No. 5 WILLIAMS & WHITE
12"x63" crosshead

No. 4 AJAX VERTICAL
11"x50" crosshead

No. 24 WILLIAMS & WHITE
7 1/2"x45" crosshead

No. 4 AJAX
8"x38" crosshead

LOUIS E. EMERMAN & CO.
1761 ELSTON AVE., CHICAGO

TWO FANS, No. 140, manufactured by Clarge Foundry Mfg. Co., Kalamazoo, Mich. Floor size 36" x 108"; elevation 84"; shaft size 3 3/16". Both arranged for belt drive on one side, but without motors. Fans are 84" in diameter with 8 blades, 20" wide.

ALSO ONE FORCED DRAFT FAN, manufactured by Garden City Fan Company of Chicago, Ill. Floor size of this fan is 42" x 80"; elevation 75", shaft diameter 2 7/16". Arranged for belt drive on both sides, but without motor. Fan 60" in diameter; 8 arms and blades 30" wide.

SWEET'S STEEL COMPANY
Williamsport, Pa.

**INDUSTRIAL PLANTS
ROLLING MILLS and
EQUIPMENT**

FRANK B. FOSTER
829 OLIVER BUILDING PITTSBURGH, PA.
Cable Address "FOSTER" Pittsburgh

Bliss No. 22N Bodymaker with Soldering, Beading, Flanging Attachment.
Cameron No. 53 Automatic Seamer.
Bliss No. 12N Bodymaker—Beading and Flanging Attachment.
Bliss No. 225 Power Slitter.
Bliss No. 81 Double Seamer.
Bliss Automatic Strip Feed Presses.
R. & S. MACHINERY CO.
19 Howard St., New York City

F. F. CRAWFORD & CO.
20 CHURCH ST.—NEW YORK
**STEEL MILL
EQUIPMENT**

Cameron No. 83 Automatic Bodymaker with Soldering Attachment.
Cameron No. 80-D Bodymakers.
Adriance No. 125 and No. 126 Double Seamers.
In A-1 Working Order
ACME MACHINERY COMPANY
40 ELIZABETH ST. NEW YORK CITY

We Have Your "Must Have" Ready For
IMMEDIATE DELIVERY
"Partial List"

SYNCH. MOTORS 350 H.P. Ridgway 900 RPM
175 H.P. G.E. 600 RPM

SLIP RING MOTORS 150 H.P. G.E. 720 RPM
125 H.P. G.E. 1200 RPM
100 H.P. G.E. 900 RPM
100 H.P. G.E. 1200 RPM
100 H.P. F.M. 600 RPM
75 H.P. West. 1200 RPM (4)
60 H.P. G.E. 900 RPM
50 H.P. G.E. 900 RPM
50 H.P. West. 1200 RPM

SQUIR. CAGE MOTORS 220 H.P. Cr. Wh. 720 RPM
150 H.P. G.E. 600 RPM
125 H.P. Al. Ch. 1750 RPM
100 H.P. G.E. 900 RPM
100 H.P. West. 720 RPM
75 H.P. G.E. 900 RPM
75 H.P. G.E. 720 RPM
75 H.P. Al. Ch. 600 RPM
75 H.P. G.E. 450 RPM
60 H.P. G.E. 1200 RPM
50 H.P. G.E. 1200 RPM
50 H.P. Bidgway 3600 RPM

A.C. GEN. 200 K.W. G.E. 720 RPM
150 K.W. Al. Ch. 900 RPM
150 K.W. G.E. 900 RPM
90 K.W. G.E. 900 RPM
75 K.W. G.E. 1200 RPM
45 K.W. G.E. 1200 RPM
30 K.W. West. 1200 RPM

MOTOR GEN. SETS 100 K.W. G.E. 230 V.
100 K.W. G.E. 115 V.
50 K.W. G.E. 230 V.
30 K.W. West. 230 V.

115 V. D.C. MOTORS 90 H.P. G.E. 900 RPM
50 H.P. G.E. 1750 RPM
40 H.P. G.E. 400/600 RPM

230 V. D.C. MOTORS 150 H.P. G.E. 1750 RPM
100 H.P. West. 625 RPM
75 H.P. Burke 1140 RPM
75 H.P. West. 850 RPM
75 H.P. E.D. 400 RPM
60 H.P. West. 1200 RPM
60 H.P. E.D. 500/1200 RPM
50 H.P. G.E. C0181082, 725/1800 RPM

30 H.P. G.E. 825/2000 RPM
15 H.P. G.E. 600/1800 RPM
15 H.P. G.E. 500/2000 RPM
10 H.P. G.E. 400/1600 RPM
10 H.P. G.E. 575/1725 RPM

550 V. D.C. MOTORS 66 H.P. G.E. 1700 RPM
50 H.P. G.E. 1200 RPM
10 H.P. G.E. 1075 RPM

ELEC. WELDERS 500 amp. West. Multiple Operator
100 amp. Hobart Portable

ELEC. HOISTS 5 Ton G.E. 230 V.
3 Ton Shepard 230 V.
2 Ton G.E. A.C.
1 Ton Euclid A.C.

PLATERS 5000 amp. Bollerier Mir. Driven

L. J. LAND—Est. 1910
140 GRAND STREET, NEW YORK, N. Y.
New York City's Largest Stock

AIR COMPRESSOR

1400' Sullivan 100 lb. pressure, direct connected to 225 H.P. 3 phase 60 cycle 2300 volt 225 r.p.m. General Electric synchronous motor, complete with starting equipment.

BELTED COMPRESSORS

9 x 12 Sullivan
9 x 12 Ingersoll-Rand
2-9 1/2 x 12 Laidlaw Worthington

ANDREN-MYERSON CORP.
411 ATLANTIC AVE., BOSTON, MASS.

MODERN AIR COMPRESSORS

All Types and Sizes
Rebuilt-Guaranteed

EARL E. KNOX COMPANY
8 West Second St. Erie, Pa.

AIR COMPRESSORS

BELTED—176 ft., 355 ft., 540 ft.
678 ft., 752 ft. & 1300 ft.
ELECTRIC—355 ft., 528 ft., 676 ft.
807 ft., 1302 ft., 1728 ft.
2022 ft., 3600 ft. & 5000 ft.
STEAM—368 ft., 500 ft., 1221 ft., 1840 ft., 2200 ft. & 3000 ft.
DIESEL—368 ft., 603 ft., 900 ft. & 1800 ft.
E. C. STANHOPE, INC.
875 Sixth Ave. New York, N. Y.

GET THE EXTRA VALUE OF
Performance Testing



It costs no more to buy Moreco Performance Tested and Guaranteed Motors...generators...transformers or other electrical equipment. Be doubly sure of proper performance. Save 30 to 75%. More than 6000 units in stock. Quick shipments.

THE MOTOR REPAIR AND MANUFACTURING CO.
1553 HAMILTON AVE. - CLEVELAND, OHIO

A. C. MOTORS—3 PHASE, 60 CYCLE

| H.P. | MAKE | VOLTS | TYPE | SPEED |
|---------|-----------|-----------|-------------------------|---------|
| 1500 | G.E. | 440/220 | ATI-Synch. | 180 |
| | West. | 2300 | C.W.-Slipping | 440 |
| 1600 | West. | 2400 | Synch. | 900 |
| 850 | West. | 2200 | C.W.-Slipping | 440 |
| 500 | Al. Chal. | 4000/2300 | Slipping | 500 |
| 450 | West. | 2200 | Synch. | 257 |
| 450/360 | West. | 2200 | C.W.-Slipping | 875/700 |
| 400 | G.E. | 4150/2300 | MT-Slipping | 390 |
| 375 | G.E. | 2300 | ATI-Synch. | 600 |
| 350 | CR. WH. | 2300/440 | Synch. | 720 |
| 300 | West. | 440/220 | C.W.-Slipping | 1800 |
| 250 | G.E. | 4000/2300 | M.T.-Slipping | 257 |
| 250 | CR. WH. | 440/220 | 128Q-Slipping | 435 |
| 250 | West. | 440/220 | C.W.-Slipping | 585 |
| 225 | Elec. | Machry. | 4150/2300 3-BRG.-Synch. | 450 |

Large Stock of FULLY GUARANTEED A. C. and D. C. MOTORS—GENERATORS—TRANSFORMERS M. G. SETS and POWER PLANT MACHINERY.

BELYEA COMPANY, INC.

147 West 18th Street New York City.

USED STEAM AND ELECTRICAL EQUIPMENT

Steam Turbines, Motor Generator Sets, Belted and Direct Connected A.C. and D.C. Generating Units, Boilers, Rotary Converters, Motors, Transformers, Etc.

ARCHER & BALDWIN, INC.

75 West Street, New York

Tel.—Bowling Green 9-0275—0276

2-400 Amp. Hansen Gasoline Engine Driven Portable Welders.
1—Model 600 P. & H. Caterpillar Crane, 50 ft. boom, 39 in. magnet.
1—7 1/2 ton P. & H. Overhead Traveling Crane, D.C. motors, 70 ft. span.
1—350 ft. and 1—500 ft. Ingersoll-Rand E.R.-I Air Compressors.

MERTES MACHINERY COMPANY
1622 S. 1st Street Milwaukee, Wisconsin

The Clearing
House is ready
by the buyers
of used mach-
inery. Your ad
here will es-
tablish contact.

THE CLEARING HOUSE

SURPLUS MACHINERY AND MOTORS

| H.P. | Speed | Volts | Make | Price |
|---|------------|----------|--------------|-------|
| 2-400 3 ph. | 60 cy. 500 | 2200 | Westinghouse | \$800 |
| 1-250 3 ph. | 60 cy. 585 | 440 | S.R. C.W. | 450 |
| 5-15 D.C. | 500/1000 | 550 G.E. | | 290 |
| 2-20 D.C. | 500/1000 | 550 G.E. | | 340 |
| 1-Rock River Punch 48" Throat, Architectural Jaw | Price | | | \$50 |
| 1-50-Ton Industrial Bay City Wreck Crane | 4,000 | | | |
| 1-20-Ton Browning Loco. Crane | 4,000 | | | |
| 1-25-Ton Industrial Bay City Loco. Crane | 5,000 | | | |
| 1-20-Ton McMyler Loco. Crane | 4,000 | | | |
| 1-15-Ton Browning Loco. Crane | 3,500 | | | |
| 1-15-Ton Morgan Bridge Crane 68' Span | | | | |
| 1-10-Ton Toledo Ore Crane 1 1/2 yd. Bucket 60' Span | | | | |

HUNTER STEEL COMPANY

3200 Grand Avenue
Neville Island
Phone Federal 4300
Pittsburgh, Penna.

WE OWN AND OFFER

1-10 ton P & H O. H. Crane with 3 ton Aux. Hoist, Serial No. 60005 45"-3" span 4 Motor A.C. 3 phs. 60 cy. 220 volt. Excellent Condition. Price \$2250.00 F.O.B. Cars our plant.
1-Ingersoll Rand 575' Air Compressor 2 stage 15 x 9 x 12 with Air Receiver and unloaded 100 lbs. belted to 105 H.P. Westinghouse A.C. Motor 3 phs. 60 cy. 2300 volt. "Almost New" Complete \$1900.00 F.O.B. Our plant.
50-50 Ton Flat Cars. All Steel Underframe. C.S. Side Frames at Chicago. Excellent Condition. Priced Right.
This is only a few of our items.

WRITE, WIRE OR CALL FOR OUR LIST OF Motors, Generators, Compressors, Boilers, Cranes, Buildings, etc.

FREESE ENGINEERING CO.
1500 E. Belleview Place Milwaukee, Wis.

MAGNETIC SEPARATOR

30"x24" C H magnetic separator pulley, 220 volts.
We also have in stock various sizes of separator magnets.

GOODMAN ELECTRIC MACHINERY CO.
1060 Broad St. Newark, N. J.

1-Large Steel Stiff Leg Derrick, with 80' boom, cap. 60 tons at 40 ft.
1-10' Lay & Nawrath Brake MD 1/4" cap.
1-10' Lay & Nawrath Shear MD 1/4" cap.
1-3000 Double Frame Steam Hammer.
1-Putnam Gap Lathe 22"-46" x 9".
1-40 ton Niles Crane, 220 DC 72' span.
1-30 ton Niles Crane, 220 DC 34' span.
1-Ingersoll Steam Driven Compressor, Type XPV3, cap. 1260 cu. ft.

SEVERIN MACHINERY CO.
30 Church St., New York City

LOCOMOTIVE CRANE: Link Belt 15 Ton, 55 ft. Boom, 8 Wheels.

AIR COMPRESSOR: Ingersoll-Rand Type NEI 12 1/2 x 12, Belt Drive. Located in East and priced extraordinarily low if purchased before removal to our warehouse.

DONAHUE STEEL PRODUCTS CO.
74th St. & Ashland Ave. Chicago, Ill.

MODERN OVERHEAD TRAVELING CRANES MONORAIL SYSTEMS & HOISTS

New and Rebuilt and Guaranteed

VICTOR R. BROWNING & CO., INC.
WILLOUGHBY, OHIO (CLEVELAND SUBURB)

ELECTRIC HOISTS — CRANES

Bought — Sold — Rented

ELECTRIC HOIST & MOTOR CO.

149 N. 9th St. BROOKLYN, N. Y.

**Profit by using
THE CLASSIFIED
SECTIONS
of The Iron Age**

FOR SALE

GENERAL ELECTRIC TURBO ALTERNATOR

1250 KW, 3600 RPM, 2300 Volt, 3 Phase, 60 Cycle, Condensing Type with direct connected 125 volt excitor.

This unit is now in operation but will be released about February 1, 1938.

For Further Information and Inspection Address

ALUMINUM COMPANY OF AMERICA
SURPLUS & TRANSFER DIVISION
801 Gulf Building, Pittsburgh, Pa.

"OVERHEAD CRANES & HOISTS"

I Own and Offer the Following:
1-7 1/2-ton Morgan, 3-motor, 65' 0" span, 220 vo. D.C. Steel mill type.
2-5-ton Case, 3-motor, 65' 0" span, 220 vo. D.C. General Electric motors.
1-3-ton P. & H., 3-motor, 28' 0" span, 220 vo. 3 ph. 60 cy. cage controlled.
1-2-ton Northern, 16' 9" span, 3-motor, 220 vo. D.C. Low head room type.

JAMES P. ARMEL, 925 Fulton Bldg., Pittsburgh, Pa.

OVERHEAD ELECTRIC CRANES

(2)-3-ton Shepard, 32' 0" span, 230-V.D.C.
5-ton Maris, 28' 2" span, 230-V.D.C.
5-ton Shepard, 40' 0" span, 230-V.D.C.
3-ton Chesapeake Gantry 50' 0" span.
3-motor type, 220/440-V.A.C.
20-ton Northern, 65' 0" span, 230-V.D.C.
10-1 to 5 ton Shepard Electric Hoists.

T. B. MacCabe Co.
Beury Bldg., Broad & Germantown Ave., Phila., Pa.

10 ELECTRIC YARD CRANES

2 to 10 ton A.C. Traveling and Stationary. 60' to 100' Radius, Full Swing. Operative inspection by appointment. Extraordinary values NOW. Also Overhead Cranes and Hoists.

N. B. PAYNE
105 W. 55th St., N. Y. Tel.: Circle 7-6730

PRICE RIGHT FOR QUICK SALE

5-ton Shaw-Box OET CRANE, cage operated, span 38' 10", vertical movement of main block 30 ft., 3 motors all Shaw-Box 220V DC.

SCULLY-JONES & COMPANY
(Fdry. Div.)
1903 So. Rockwell St., Chicago, Ill.

LIFTING MAGNETS

22" 36" 43" 55"

We furnish completely rewound magnets guaranteed one year. We buy, sell, rent and repair magnets.

GOODMAN ELECTRIC MACHINERY CO.
1060 Broad St. Newark, N. J.

RR NEW-USED RECLAIMED
IRON & STEEL
ALBERT PIPE SUPPLY CO. Inc.
Berry and North 13th St. Brooklyn, N.Y.

"Anything containing IRON or STEEL"

IRON & STEEL PRODUCTS, Inc.

BUYERS SELLERS TRADERS
Chicago (Hegewisch Sta.), Illinois
Phone South Chicago 9430

FOR SALE

CARS and LOCOMOTIVES

1-90-ton 0-8-0 Switcher, 15' 6" W.B.

2-21-ton Porter S/T, 36" G.

1-40-ton 0-6-0 Baldwin Switcher, 9' 9" W.B.

30 TON S. G. GAS & SWITCHING LOCO., AUTO. DUMP CARS, S. G. unless noted

36-5-ton Western, 36" Steel, Ex. cond.

4-12-yd. Western, Wood, Fair condition.

24-12-yd. Western, Steel, Ex. cond.

12-20-yd. Western, 1920, Steel, Good cond.

16-20-yd. Mager, 1919, Steel, Ex. cond.

4-20-yd. Koppel, 1928, Steel, Ex. cond.

5-30-yd. Clark, Steel.

50-10,000 Gal. Tank Cars, Cheap.

Also Hoppers, Gons., Flat, Box, etc.

CAR REPAIR PARTS

Complete Shaft Mining Outfit. Send for list.

Nordberg track shifter.

STEEL Bridge, two sections 101' each.

6 1/2 YD. BUCYRUS ELECTRIC SHOVEL BUILDINGS

62"x400' with crane runway.

New Shop Bldg., never erected. 445'x730': five-section for 20-ton Cranes. Will split.

2-50"x300' Steel Sheds.

ALSO OTHER BUILDINGS.

CRANES: TRAVELING and POWER:

2-20-ton Whiting, OH.

1-5-ton Whiting, OH.

1-Each, 10, 15 & 20-ton gantries.

1-1-yd. 301 Kehring Gas Cat. Crane.

1-10-ton Brownholst 99s. crawler.

1-15-ton Brownholst loco. type with Gen.

1-30-ton Browning, loco. type.

1-20-ton O.S. loco. type.

1-2-yd. Monighan dragline.

2-Mine Hoists, electric, 100 & 200 H.P.

NEW G. E. O. H. CRANE MOTORS

Replace your old ones cheaply!

9.5-10 HP; 8-25 HP; 7-20 HP; 3/60/440.

Ball-bearing Slip-Eng. with Brakes & A-B controls.

HOWELL, AC, S, 3, 5, 6, 8, 10, 13, 15 HP.

1, 300 KW, 600V DC Rotary Con. & Trans. 6 PH.

ENGINES, GENERATORS, ETC.

1-1000 KW G.E. con. Turbo-Gen. 3/60/2300.

3-938 KVA non-con. Turbo-Gen. 3/60/2300.

3-500 KW G.E. con. Turbo-Gen. 3/60/2300.

1-50 HP I-20 HP, I-5 HP steam.

1-each 30, 75, 100 & 150 KW DC eng.-gens.

2-120/175 HP Winton gasoline engines.

1-48" x 100" steel smoke stack.

130 KVA-3/60/220 Baffled.

BOILERS, ETC.

2-350 HP, 4-500 HP B. & W. with super heaters & chain-grate stokers.

1-50 HP, I-100 HP fire box.

2-2000 HP open feed Water Heaters.

AIR COMPRESSORS

1-1000 C.F. IR steam driven.

1-888 C.F. I.R. Type XB Belted.

1-700 C.F. I.R. Type IU steam.

2-500 C.F. I.R. steam driven.

PUMPS

1-10" full manganese, gravel.

2-1000 GPM-350 FM Motor Driven.

1-800 GPM-350 FM Motor Driven.

1-500 GPM-450 FM Turbine Driven.

1-450 GPM-350 Turbine Driven.

15-Misc. elec. & steam.

MERCHANT NEW STEEL

35 tons Rounds & 5 tons Flats, Kansas.

11 tons SAE 3140 Half Rounds, Texas.

TINPLATE COBBLES

20-30 36 & 48" C.I. Pipe, Valves & Fittings.

Extra Heavy Steel Pipe, Valves & Fittings.

7/8" I.D. — 1" O.D. Admir. Brass Tubing.

Send for our Bulletins

WANTED

MILLS and BLAST FURNACES

ELECTRIC MELTING FURNACES

STEEL BUILDINGS ANY LOCATION.

CRANES O. H., GANTRY LOCO. & TRACTOR.

CARS and LOCOMOTIVES

CAR REPAIR PARTS

SCRAP: TUNGSTEN BEARING

BUYERS SELLERS TRADERS

Send for our Adgit Pencil.

ALBERT & DAVIDSON PIPE CORP.

D E
NEW-USED-UNTESTED

2nd Ave. 50th-51st St. EST. 1904 Brooklyn, N.Y.

Second Hand
Wrought Iron
and Steel
PIPE
Overhauled
Rethreaded
Coupled

All Sizes in Stock

Greenpoint Iron & Pipe Co., Inc.
Stagg & Bogart Sts., Brooklyn, N. Y.

THE CLEARING HOUSE

WE BUY OR SELL
IRON
 INDUSTRIAL
 NEW AND RECONDITIONED
IRON
 SALVAGE
IRON
 MACHINERY
 AND SUPPLIES
 COMPLETE FACILITIES
 BRADFORD
 SUPPLY COMPANY
 WAYNE, OHIO

WANTED

WANTED
Boring Mill 30 ft. Diameter
 Must be in good condition
 Mail description and price immediately.
Treadwell Construction Co.
 MIDLAND, PA.

WANTED TO PURCHASE a 1000 to 1200 H.P., 2300 V., 3 phase, 60 cycle electric motor; either slip-ring or synchronous, synchronous preferred. Quotations should state power factor, pull-in and pull-out torque, age, condition and other pertinent information.

SWEET'S STEEL COMPANY
 Williamsport, Pa.

MIDLAND STEEL & EQUIPMENT CO.
 404 South Clinton Street, Chicago, Illinois

*The
 Largest Buyers
 of
 Surplus Steel Inventories*

WANTED TO BUY
High Speed Steel
 SCRAP
CHICAGO ALLOY PRODUCTS CO.
 712 Liberty St. Chicago, Ill.

WANTED
Your Inquiries and Offerings
 and perusal of our detail advertisement on page 131
 of the Classified Section.
 It may "pay" you to do so!
IRON & STEEL PRODUCTS, INC.
 Chicago (Hegewisch Sta.), Illinois
 Phone South Chicago 9430
 "Anything containing IRON or STEEL"

WANTED TO BUY
SURPLUS AND OBSOLETE LOTS
 SHEET STEEL, TINMILL
 PRODUCTS, STRIP STEEL
 ADDRESS BOX S-249
 Care The Iron Age, 239 W. 39th St., New York

EQUIPMENT

26-12 yd. Western Air or Hand Dump Cars
 11-50 ton 40 ft. Flat Cars
 8-50 ton 40 ft. Steel Gondolas
 22-50 ton Steel Hopper Coal Cars
 1-25 ton Browning Locomotive Crane
 1-20 ton Ohio Locomotive Crane
 2-40 ton Baldwin 4-Driver S.T. Locomotives
 12-5 yd. 36" ga. Western Dump Cars
 3-1½ yd. 36" ga. Koppel V Dump Cars
 Cars and Locomotives of all types.

HYMAN-MICHAELS CO.

20 N. Wacker Drive Bldg., Chicago
 Ry. Exchange Bldg.
 St. Louis, Mo. 101 West 31st St.
 New York

CONTRACT Manufacturing

ATLANTIC MANUFACTURING CO.


 SPECIALISTS IN
 TOOLS-DIES-JIGS-FIXTURES
 FOR THE
 AUTOMOTIVE & RADIO
 INDUSTRIES
 875 N. 28th ST., PHILA., PA.
 SERVICE 24 HRS. A DAY

STAMPINGS

Light and Medium
 Electric Spot Welding and
 Assembled Units

We specialize in designing stampings to substitute castings. Dies designed and built for quantity production.

Eastern Tool & Stamping Co., Inc.
 39 Ballard Street, Saugus, Mass.

SCREW MACHINE PRODUCTS

OF EVERY DESCRIPTION
 SMALLEST UP TO 2 1/4"
 HARDWARE SPECIALTIES

OLSON MFG. CO.
 Worcester, Mass.

HOT DIP GALVANIZING

We have the largest hot dip galvanizing plant and kettles in the United States. We have the most modern equipment to do first class galvanizing at lowest prices. Prime Western Zinc used exclusively. Galvanized products furnished.

Send Us Your Inquiries

Joseph P. Cattie & Brothers
 Gaul and Letterly Streets
 Philadelphia

MONEL AND PURE NICKEL

CASTINGS

Superior Bronze Corporation

ERIE, PENNA.

BRASS, BRONZE AND ALUMINUM CASTINGS

ALLOY IRON CASTINGS

a specialty

CONTRACT MACHINE WORK

requiring large machine tools

MURRAY IRON WORKS COMPANY

BURLINGTON, IOWA

RELAYING RAILS

2,000 tons 80² ASCE, complete with angle bars.
 2,000 tons 60² ASCE and PRB sections, complete with
 angle bars. Ready for immediate shipment.

M. K. FRANK

480 Lexington Ave.,
 New York City 450 Fourth Ave.,
 Pittsburgh, Pa.

RAILS "1 Ton or 1000"

NEW RAILS—5000 tons—All Sections—All Sizes.
 RELAYING RAILS—25,000 tons—All Sections—All
 Sizes, practically as good as New.
 ACCESSORIES—Every Track Accessory carried in
 stock—Angle and Splice Bars, Bolts, Nuts, Frogs,
 Switches, The Plates.
 Buy from One Source—Save Time and Money.
 "Phone, Write or Wire.

L. B. FOSTER COMPANY, Inc.
 PITTSBURGH NEW YORK CHICAGO

BUSINESS Opportunities

PLANT LIQUIDATION

All equipment of Canton Car Co., Canton, Ohio: Punches, Plate Shears, Scrap Shears, Direct connected synchronous motor driven Air Compressors, Electric Shop Trucks, Hoists, Etc. Write for complete list and prices.

POST OFFICE BOX 1257
 HAMMOND, INDIANA

For Sale or License Thereunder—

Three patents and two allowed applications containing a total of one hundred eighteen claims covering broadly a method of and apparatus for rolling sheets and bars directly from metal delivered in a molten condition—No Ingots—Double the production of present methods.

H. R. Van Deventer Incorporated
 342 Madison Avenue, New York, N. Y.

ELECTRIC MELTING FURNACES

Advertisers wish to dispose of United States and Canadian rights for license and control to build in these countries special type electric 3-phase arc Furnaces having hydraulic regulators, electric mixers and other equipment. Special advantages of these furnaces and European backing will be given.

Those interested, who wish to negotiate, write Metalelectric Furnaces, Ltd., Cornwall Road, Smethwick, Birmingham, England.

Light Lathe Work GERMAN SCREW MANUFACTURER

with first class plant and independent financial resources wishes to get into touch with American firms interested in having their products marketed in Germany.

Please apply to
Johannes Schaefer, Stettiner Schraubenwerk,
 Stettin, Germany

We are considering adding one major account. This is a very successful industrial selling and engineering organization in the Chicago metropolitan territory. Product must be high-grade industrial or steel mill equipment. We have led the field in sales this year with the two accounts we now represent.

Address Box S-499
 Care The Iron Age, 239 W. 39th St., New York

EMPLOYMENT EXCHANGE

EMPLOYMENT SERVICE

SALARIED POSITIONS \$2,500 to \$25,000

This thoroughly organized advertising service of 28 years' recognized standing and reputation carries on preliminary negotiations for positions of the calibre indicated, through a procedure individualized to each client's personal requirements. Several weeks are required to negotiate and each individual must finance the moderate cost of his own campaign. Retaining fee protected by a refund provision as stipulated in our agreement. Identity is covered and, if employed, present position protected. If you have actually earned over \$2,500, send only name and address for details.

R. W. BIXBY, Inc.
274 Delward Bldg., Buffalo, N. Y.

HIGH GRADE MEN

Qualified candidates desiring salaried positions are invited to use our individual and confidential services in contacting responsible employers. We negotiate all preliminary overtures.

Established 1915

THE NATIONAL BUSINESS BOURSE
H. H. Harrison, Director
20 W. Jackson Blvd., Chicago

HELP WANTED

A JOBBER OF TIN PLATE, Black and Galvanized sheets, who is expanding and intends to carry a full line of Strip Steel, desires the services of two salesmen, one who has experience in Tin Plate and Sheets and one who is acquainted in the metropolitan district with the users of Strip Steel. Those who qualify will make excellent connections. State qualifications. Address Box S-503, care *The Iron Age*, 239 W. 39th St., New York.

FOUNDRY SUPERINTENDENT with marketing and sales experience covering high grade special alloy steel castings. Thorough knowledge of sand control, pattern layouts, etc., necessary. Must be capable of assuming full charge of manufacturing of present products and development of additional lines. Address Box S-502, care *The Iron Age*, 239 W. 39th St., New York.

HELP WANTED

WANTED—PRODUCTION MAN. To superintendents or assistant superintendents of first class plants making heavy machinery and who have proven themselves real producers we offer an unusual opportunity. Must be A-1 mechanic between 35 and 40 and have thorough knowledge of machine shop operations, plate and sheet metal forming and welding. Foundry and pattern shop experience helpful but not essential. Do not waste postage answering unless you fill above specifications. To receive consideration, give in first letter, your age, education, training, places employed, lengths of service and salary expected. All replies in absolute confidence. Address Box S-493, care *The Iron Age*, 239 W. 39th St., New York.

TUBING SALESMAN FOR OHIO TERRITORY. Commission and salary basis. Expect good acquaintance with industrial field. Can give opportunity for capital investment. In answering indicate age, experience and other fundamental factors. Address Box A-769, care *The Iron Age*, 428 Park Bldg., Pittsburgh, Pa.

WANTED: DIRECT OR MANUFACTURER'S AGENT thoroughly familiar with the sale of merchant steel pipe in any one of the following territories: Los Angeles, St. Paul, New Orleans, Cleveland and Chicago. Address Box S-496, care *The Iron Age*, 239 W. 39th St., New York.

SITUATIONS WANTED

MANUFACTURING EXECUTIVE — with an interesting record in handling management, sales, finance, production and other vital duties in connection with machinery, tool, foundry and allied industries is available for position as General Manager of medium-size company requiring mature, dependable ability that produces results. Experience covers all positions from Accountant to Secretary-Treasurer including fifteen years as General Manager. Ability to develop efficient organization and build up sales, production and net profits assured by previous record. Address Box S-498, care *The Iron Age*, 239 W. 39th St., New York.

ENGINEER, NOW EMPLOYED, with large firm of consultants wishes position as manager of machinery manufacturing plant, preferably on profit sharing basis. Has had responsible charge of foundry machine and forge shops. Technical and practical training. Prefer a plant requiring rebuilding. Address Box S-500, care *The Iron Age*, 239 W. 39th St., New York.

SITUATIONS WANTED

METALLURGIST: Sheffield University Graduate; Calculations, melting, chemical, physical, microscopic, macrostructure analysis; heat treating, iron-carbon, iron-carbon alloy series; cast iron; foundry experience. Address Box S-501, care *The Iron Age*, 239 W. 39th St., New York.



The Month of Rejoicing

—and we rejoice when we think of the many complimentary expressions we have received during the year indicating that the Help Wanted Department of *The Iron Age* continues to give satisfactory service to hundreds of firms who have employed men—competent men—through it.

*Rates for
Help and
Situation*

Wanted Ads

Help Wanted Rates

Set solid, minimum 50 words..... \$5.00
Each additional word 10c

All capitals, minimum 50 words..... \$6.50
Each additional word 13c

All capitals, leaded, minimum 50 words..... \$7.50
Each additional word 15c

Situation Wanted Rates

Set solid, minimum 25 words..... \$1.00
Each additional word 4c

All capitals, minimum 25 words..... \$1.75
Each additional word 7c

All capitals, leaded, minimum 25 words..... \$2.50
Each additional word 10c

COUNT SEVEN WORDS FOR KEYED ADDRESS

Display Advertising Rates Given on Request

Do not send cash through the mail—Use money order or check.

DO NOT SEND ORIGINAL LETTERS of recommendation in replying to advertisements—duplicates will answer the purpose. Letters forwarded without charge.

ADVERTISERS INDEX

A

| | |
|--|-------|
| Abbott Ball Co., The..... | 109 |
| Acme Machinery Co..... | 130 |
| Aetna-Standard Engineering Co., The..... | 4 |
| Ajax Mfg. Co., The..... | 78 |
| Alan Wood Steel Co..... | 56 |
| Albert & Davidson Pipe Corp..... | 131 |
| Albert Pipe Supply Co., Inc..... | 131 |
| Aluminum Co. of America..... | 131 |
| American Chemical Paint Co..... | 124 |
| American Hammered Piston Ring Div. Koppers Co..... | 19-20 |
| American Hollow Boring Co..... | 113 |
| American Steel & Wire Co..... | 8-9 |
| American Steel Export Co., Inc..... | 113 |
| Andren-Myerson Corp..... | 130 |
| Archer & Baldwin, Inc..... | 130 |
| Armel, James P..... | 131 |
| Armstrong-Blum Mfg. Co..... | 81 |
| Armstrong Bros. Tool Co..... | 70 |
| Athenia Steel Co., The..... | 107 |
| Atlantic Mfg. Co..... | 132 |
| Atlas Car & Mfg. Co..... | 60 |

B

| | |
|--|----------|
| Baird Machine Co., The..... | 108 |
| Barnes, Wallace, Co., The, Div. of Associated Spring Corp..... | 22 |
| Bartlett Hayward Div. Koppers Co..... | 19-20 |
| Beatty Machine & Mfg. Co..... | 129 |
| Belmont Iron Works..... | 118 |
| Belyea Co., Inc..... | 130 |
| Bethlehem Steel Co..... | 3 |
| Bissett Steel Co., The..... | 72 |
| Bixby, R. W., Inc..... | 133 |
| Bliss & Laughlin, Inc..... | 71 |
| Bradford Supply Co., Inc..... | 132 |
| Brassert, H. A., & Co..... | 118 |
| Brooke, E. & G., Iron Co..... | 125 |
| Browning, Victor R., & Co., Inc..... | 131 |
| Buffalo Mchry. Co., Inc..... | 127, 128 |
| Buffalo Wire Wks. Co., Inc..... | 125 |
| Bullard Co., The..... | 52 |
| Business Opportunities Section..... | 132 |

C

| | |
|--|---------|
| Cadman, A. W., Mfg. Co..... | 64 |
| Canton Fdry. & Mach. Co..... | 116 |
| Carbon Malleable Casting Co., Inc..... | 114 |
| Carnegie-Illinois Steel Corp..... | 8-9 |
| Cattie, Joseph P., & Bros..... | 132 |
| Central Iron & Steel Co..... | 69 |
| Chicago Alloy Products Co..... | 132 |
| Cincinnati Bickford Tool Co., The..... | 62 |
| Clearing House Section..... | 127-132 |
| Cleveland Cap Screw Co., The..... | 74 |
| Cleveland Steel Tool Co., The..... | 111 |
| Chimax Molybdenum Co..... | 103 |
| Cold Metal Process Co..... | 63 |
| Columbus Steel Co..... | 8-9 |
| Commercial Steel Casting Co..... | 114 |
| Commonwealth Brass Corp..... | 122 |
| Coneo Engineering Works..... | 116 |
| Cone Automatic Mach. Co., Inc..... | 109 |
| Continental Steel Corp..... | 74 |
| Contract Manufacturing Section..... | 132 |
| Crawford, F. H., & Co., Inc..... | 130 |
| Crosby Co., The..... | 107 |
| Crucible Steel Castings Co..... | 114 |

D

| | |
|---|-----|
| Darwin & Milner, Inc..... | 112 |
| Davenport Locomotive Works..... | 116 |
| Detroit Hoist & Machine Co..... | 117 |
| Detroit Rex Products Co..... | 79 |
| Donahue Steel Prods. Co., Inc..... | 129 |
| Dony, D. E., Mchry. Co..... | 128 |
| Dreis & Krump Mfg. Co..... | 112 |
| Dunbar Bros. Co., Div. of Associated Spring Corp..... | 75 |

E

| | |
|---|----------|
| Earle Gear & Mach. Co..... | 117 |
| Eastern Machine Screw Corp., The..... | 111 |
| Eastern Tool & Stpg. Co., Inc..... | 132 |
| Electric Hoist & Motor Co..... | 131 |
| Elyria Belting & Mchry. Co..... | 127 |
| Emerman, Louis E., & Co., Inc..... | 128, 130 |
| Employment Exchange Section..... | 133 |
| Eng'ering & Construction Div. Koppers Co..... | 19-20 |
| Espen-Lucas Mach. Wks., The..... | 111 |
| Essley, E. L., Mchry. Co., The..... | 128 |

F

| | |
|-------------------------------|-----|
| Fairmount Foundry, Inc..... | 115 |
| Falls Clutch & Mchry. Co..... | 118 |
| Flinn & Drefelin Co..... | 118 |
| Ford, J. B., Co., The..... | 57 |
| Foster, Frank B..... | 130 |
| Foster, L. B., Co., Inc..... | 132 |
| Frank, M. K..... | 132 |
| Froese Engineering Co..... | 131 |

G

| | |
|---|-----------|
| Galland-Henning Mfg. Co..... | 80 |
| Gas & Coke Div. Koppers Co..... | 19-20 |
| General Electric Co..... | 11, 16-17 |
| Gleason Works..... | 59 |
| Goodman Electric Machinery Co..... | 131 |
| Goodrich, B. F., Co., The..... | 7 |
| Goss & DeLeenw Mch. Co..... | 111 |
| Grammes, L. F., & Sons, Inc..... | 115 |
| Greenpoint Iron & Pipe Co., Inc..... | 131 |
| Griffin Mfg. Co., Inc..... | 112 |
| Gulf Oil Corp. Gulf Refining Co. Inside Front Cover | |

H

| | |
|---|----------|
| Hanna Furnace Corp..... | 125 |
| Harnischfeger Corp..... | 116 |
| Harrington & King Perforating Co., The..... | 81 |
| Hassall, John, Inc..... | 123 |
| Hayward Co., The..... | 115 |
| Heald Machine Co..... | 55 |
| Hendrick Mfg. Co..... | 119, 125 |
| Hill-Clarke Mchry. Co..... | 129 |
| Holcroft & Co..... | 107 |
| Hunter Steel Co..... | 131 |
| Hyde Park Fdry. & Mch. Co..... | 124 |
| Hyman, Joseph, & Sons..... | 129 |
| Hyman-Michael Co..... | 132 |

I

| | |
|--|----------|
| Indianapolis Mchry. & Supply Co., Inc..... | 128 |
| Industrial Machinery Co..... | 128 |
| Inland Steel Co..... | 21 |
| International Nickel Co., Inc. Inside Back Cover | |
| Iron & Steel Prods. Inc..... | 131, 132 |

J

| | |
|------------------------------|-------|
| Jarecki Mfg. Co..... | 122 |
| Keagler Brick Co., The..... | 75 |
| Kennard & Williams, Inc..... | 127 |
| Knox, Earl E., Co..... | 130 |
| Koppers Co..... | 19-20 |
| Koppers Coal Co..... | 19-20 |
| Koppers-Rheolaveur Co..... | 19-20 |

K

| | |
|--------------------------------------|-----|
| Land, L. J..... | 130 |
| Landis Machine Co., Inc..... | 58 |
| Latrobe Electric Steel Co..... | 112 |
| Lee Spring Co., Inc..... | 124 |
| Leland-Gifford Co..... | 109 |
| Leschen, A., & Sons Rope Co..... | 126 |
| Lillie, Dexter P., & Co..... | 124 |
| Linde Air Products Company, The..... | 6 |
| Lucas Mch. Tool Co., The..... | 109 |

L

| | |
|----------------------------------|-------|
| MacCabe, T. B., Co..... | 131 |
| Machler, Paul, Co., The..... | 80 |
| Malleable Iron Fittings Co..... | 114 |
| Maris Brothers, Inc..... | 117 |
| Marr-Galbreath Machinery Co..... | 129 |
| Maryland Drydock Co., The..... | 19-20 |
| Mertes Machinery Co..... | 130 |
| Metalelectric Furnaces, Ltd..... | 132 |
| Midland Steel & Equip. Co..... | 132 |
| Miles Mchry. Co..... | 128 |
| Morey Mchry. Co., Inc..... | 128 |
| Morgan Construction Co..... | 67 |
| Motor Repair & Mfg. Co..... | 130 |
| Moyer, J. N..... | 129 |
| Mundt, Chas., & Sons..... | 119 |
| Murray Iron Wks. Co..... | 132 |

M

| | |
|----------------------------------|-------|
| MacCabe, T. B., Co..... | 131 |
| Machler, Paul, Co., The..... | 80 |
| Malleable Iron Fittings Co..... | 114 |
| Maris Brothers, Inc..... | 117 |
| Marr-Galbreath Machinery Co..... | 129 |
| Maryland Drydock Co., The..... | 19-20 |
| Mertes Machinery Co..... | 130 |
| Metalelectric Furnaces, Ltd..... | 132 |
| Midland Steel & Equip. Co..... | 132 |
| Miles Mchry. Co..... | 128 |
| Morey Mchry. Co., Inc..... | 128 |
| Morgan Construction Co..... | 67 |
| Motor Repair & Mfg. Co..... | 130 |
| Moyer, J. N..... | 129 |
| Mundt, Chas., & Sons..... | 119 |
| Murray Iron Wks. Co..... | 132 |

N

| | |
|---|-------------|
| National Bearing Metals Corp..... | 114 |
| National Business Bourse..... | 133 |
| National Lumber & Creosoting Co..... | 19-20 |
| National Machinery Exchange..... | 129 |
| National Steel Corp..... | 12, 125 |
| National Tube Co..... | 8-9 |
| New Departure Div. General Motors Corp..... | Front Cover |
| New England Coal & Coke Co..... | 19-20 |
| Nilson, A. H., Mch. Co..... | 118 |

O

| | |
|--|-----|
| O'Brien Mchry. Co., The..... | 127 |
| Ohio Locomotive Crane Co., The..... | 116 |
| Ohio Seamless Tube Co., The..... | 73 |
| Olson Mfg. Co..... | 132 |
| Ottendorfer, Wm. H., Co., Inc..... | 123 |
| Parish Pressed Steel Co..... | 68 |
| Parker-Kalon Corp..... | 123 |
| Payne, N. B..... | 131 |
| Pearla Malleable Castings Co..... | 114 |
| Pittsburgh Lectromelt Furnace Corp..... | 122 |
| Pittsburgh Metallurgical Co., Inc..... | 101 |
| Platt Bros. & Co., The..... | 126 |
| Poor & Co., Canton Forge & Axle Works..... | 113 |
| Production Machine Co..... | 109 |
| Progressive Mfg. Co., The..... | 123 |

R

| | |
|---|----------|
| R & S Machinery Co..... | 130 |
| Reliance Machinery Sales Co..... | 129 |
| Rhoades, R. W., Metaline Co., Inc..... | 109 |
| Ridgway, Craig, & Son Co..... | 115 |
| Ritterbush & Co., Inc..... | 127 |
| Robbins & Myers, Inc..... | 117 |
| Rockford Drop Forge Co..... | 113 |
| Roebling's, John A., Sons Co., Inc..... | 15 |
| Rosenkranz, Weisbecker & Co., Inc..... | 127, 128 |
| Rustless Iron & Steel Corp..... | 105 |
| Ryerson, Jas. T., & Son, Inc..... | 24 |

S

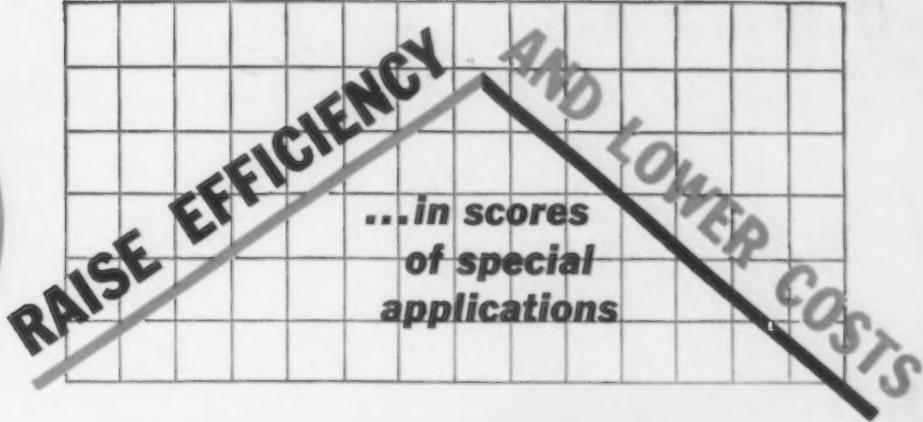
| | |
|---------------------------------------|----------|
| Schaefer, Johannes..... | 132 |
| Screw Machine Products Corp..... | 123 |
| Scully-Jones & Co..... | 131 |
| Seneca Wire & Mfg. Co., The..... | 126 |
| Severin Machinery Co..... | 131 |
| Shore Instrument & Mfg. Co., The..... | 124 |
| Simmons Mch. Tool Corp..... | 127 |
| Simonds Mfg. Co., The..... | 117 |
| Sleeper & Hartley, Inc..... | 122 |
| Standard Pressed Steel Co..... | 124 |
| Stanhope, R. C., Inc..... | 130 |
| Stanley Works, The..... | 112 |
| Strand, N. A., & Co..... | 111 |
| Superior Bronze Corp..... | 132 |
| Sweet's Steel Co..... | 130, 132 |

T

| | |
| --- | --- |
| Tar & Chemical Div. Koppers Co..... | 19-20 |

<tbl_r cells="2" ix="3" maxcspan="1" maxrspan="1

HIGH NICKEL ALLOYS

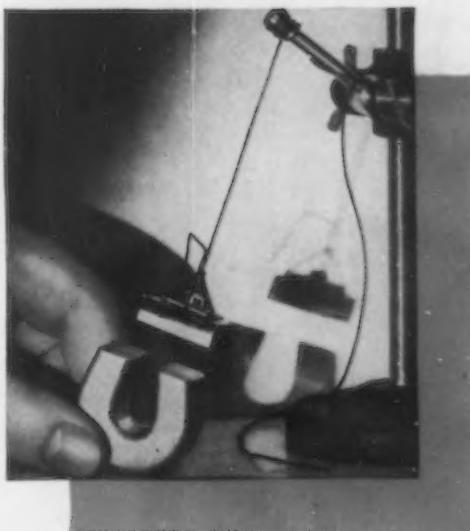


HIGH MAGNETIC QUALITIES... The magnet pictured here is small, but extraordinarily powerful—capable of lifting 60 times its own weight. This particular type, made of a new alloy rich in Nickel, is used for damping magnets in the polyphase meters of the Duncan Electric Co., Lafayette, Ind. Not only do these alloys of high Nickel content effect substantial savings in weight (in this case 30%) but they also have a higher permanency factor than other commercially available magnetic materials and are practically immune to the effects of magnetic disturbances caused by short circuits and lightning. Manufacturers who employ magnetic materials in their products will find these new alloys of Nickel profitable to investigate.



HIGH AND LOW EXPANSION PROPERTIES...

One of the most valuable metallurgical developments in recent years has been the production of thermostatic metals for operating automatic control devices. Pictured here is one employing a bi-metallic disc made of two alloys of Nickel, one having a high degree of expansion and the other low expansion properties. It guards the Westinghouse refrigerator motor, disconnecting it when it gets too hot and reconnecting it when it cools off. Principle upon which these thermostatic metals operate is based on a differential in the expansion properties of the two constituent metals. Changes in temperature cause them to deflect and this in turn acts on the control device. Alloys of Nickel can be produced for applications requiring extremely low expansions as well as for service where specific expansion characteristics may or may not be low.

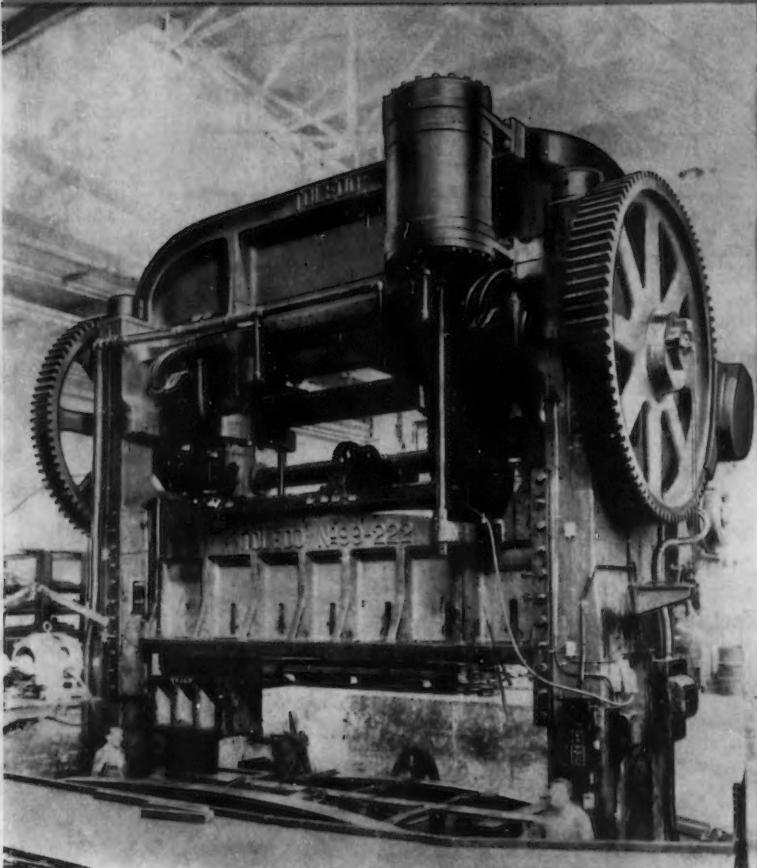


IMPROVED PERMEABILITY... When you make your long distance telephone call or send a cable, a highly magnetic Nickel-Iron alloy of improved permeability containing up to 80% Nickel helps to deliver your message. Impulses sent over long circuits have a tendency to drag their "tails" behind them, upon which succeeding impulses tread. But through the use of loading coils made of a high Nickel alloy, and spaced at regular intervals along the circuit, transmission is speeded up and your words made intelligible. The high magnetic permeability of these alloys is also depended upon to increase the efficiency of submarine cables and various parts of radio, telephonic and telegraphic installations. We invite consultation on the use of the Nickel alloys in your equipment.



THE INTERNATIONAL NICKEL COMPANY, INC., NEW YORK, N.Y.

BUDD USES TIMKEN-EQUIPPED PRESSES IN MANUFACTURING AUTOMOBILE BODY AND CHASSIS PARTS



A symbol of quality for any piece of equipment with which it is associated



8 Budd-built Zephyrs are now rolling on TIMKEN Bearings. Glide—as you ride a Timken-equipped Train

THE TIMKEN ROLLER BEARING COMPANY, CANTON, OHIO

Manufacturers of Timken Tapered Roller Bearings for automobiles, motor trucks, railroad cars and locomotives and all kinds of industrial machinery; Timken Alloy Steels and Carbon and Alloy Seamless Tubing; Timken Rock Bits; and Timken Fuel Injection Equipment.

TIMKEN TAPERED ROLLER BEARINGS

tain factors present themselves repeatedly and with such force that it is impossible not to form some very definite convictions as to the value of each. These conclusions are summarized as follows:

1—It is more difficult and also more expensive to obtain an accurate master rack than to obtain an accurate master circular cutter.

2—The rack cannot be used as close to shoulders or other gears in a cluster as the circular cutter.

3—There is a factor in shaving operations difficult to define but commonly referred to as control. The gear being shaved is not restricted in its rotation with the master by anything except the master. If we are to impart uniform

angular velocity to this gear, it is necessary, of course, that the tooth spacing of the master be uniform, but there is also the factor of wrap or angle of contact between the gears. The rack type cutter is superior in this respect to the circular type cutter because of its inherently greater wrap. It has more control over the gear being finished.

4—The rack type is defective to the extent that any error in the master is transferred directly to the gear, due to the fact that as the gear is rotated each of its teeth always meshes with the same respective space in the master. With a circular cutter type a hunting tooth will average errors around circumference of the gear.

Each new gear to be shaved must be analyzed in the light of the conclusions drawn and allocated to the type of machine most likely to produce most accurate results.

Mr. Haynes also discussed various methods of grinding gear teeth, usually necessary with gears having sections that shrink non-uniformly. A formed wheel grinder may be used, but usually the choice is some form of generation. Single and double dish wheels set at an angle to conform to the side of a rack tooth are in common use, but the method is slow and is restricted to gear teeth having a face length and clearance within the arc and chordal characteristics of the grinding wheel. Another type consists of a small wheel dressed to the shape of a complete rack tooth and passed through the gear teeth in short, shaper-like strokes, while the gear is rolled in the path of the gear by a master. Here a complete tooth is ground at one time, making for rapid production, and face lengths are limited only by the stroke characteristics of the machine.

MAEHLER OVENS
for all baking applications



The PAUL MAEHLER Co.
2218 W. LAKE ST. — CHICAGO

▼ TRIPLE COMPRESSION
SCRAP BALERS ▼



STYLE
100 TC
(100 x 51 x 36)
and other sizes
▼
Also Regular
Double
Ram Presses
in all sizes

GALLAND-HENNING
MANUFACTURING COMPANY
2724 S 31st Street Milwaukee, Wisconsin

COMPLETE LINE OF BALERS: Electric and Hydraulic, also HYDRAULIC PRESSES AND PUMPS

Clark Brothers Exhibits Bolt Plant of 1840

FRONT walls and part of the roof of a historic old building erected in 1840 for manufacture of bolts and nuts have been reassembled and set up in the lobby of the office of the Clark Brothers Bolt Co., Milldale, Conn.

The boards are moss covered and weathered and the hand forged nails covered with rust. The windows with their unique design and the old batten doors with old hand forged hardware and squeaky hinges are just as in 1840. The wood shingles are warped and weathered but still good.

PERSONALS

(CONTINUED FROM PAGE 64)

Corp. of St. Joseph, Mich. Others elected at the association's annual meeting Wednesday, Dec. 15, at the Hotel Statler, Detroit, are: First vice-president, GEORGE HARDER, president, I. Stephenson Co., Wells, Mich.; second vice-president, W. J. CORBETT, vice-president, Sparks-Withington Co., Jackson; third vice-president, R. R. HICKS, president, American Steam Pump Co., Battle Creek; treasurer, M. J. MURPHY, president, Murphy Chair Co., Detroit.

To fill the unexpired terms of D. R. WILSON and R. R. HICKS, JULIAN B. HATTON, president, Eagle Ottawa Leather Co., Grand Haven, Mich., and JOHN L. A. GALSTER, president-treasurer, Petoskey Portland Cement Co., Petoskey, were elected directors.

To fill the unexpired terms of W. F. CORBETT and FRED WESTOVER, FRED M. MOORE, president, Diamond Crystal Salt Co., St. Clair, and M. SETH BABCOCK, chairman of the board, Bay City Shovels, Inc., were chosen.

For directors of the three-year term: L. C. WALKER, Shaw-Walker Co., Muskegon; HOWARD BLOOD, Norge Corp., Detroit; J. R. MILLAR, National Automotive Fibers, Inc., Detroit; SAMUEL CLARK, Baldwin Rubber Co., Pontiac, and L. C. UPTON, Nineteen Hundred Corp., St. Joseph, were named.



... New business quiet, but pressure for deliveries is unrelaxed.

ONDON, Dec. 21 (By Cable)— Seasonal influences are now developing and new business is quiet, but pressure for deliveries for heavy iron and steel is unrelaxed and record outputs are still being achieved.

Cleveland blast furnaces are heavily sold for the first quarter and still are in short supply with no early prospect of a material increase. Purchasing of foreign pig iron has ceased through the extension of the loyalty rebate scheme.

A shipment of 8000 tons of Brazilian iron ore is reported arrived at Tees. This is the first shipment

of the 400,000 tons recently purchased through the British Iron and Steel Federation for shipment over two years.

The tin plate market is quiet, with small improvement in the volume of inquiries. Unfilled orders are under 3,500,000 base boxes. Eleven months' exports amount to nearly a 100,000-ton increase over a year ago. Black sheets are quiet, and galvanized sheets are idle.

Stocks in Indian reported at about 40,000 tons. November shipments, all ports, only 8500 tons, a new post-war low record.

Laclede Steel Co., St. Louis, has declared a dividend of \$1.25 a share on its common stock, payable Dec. 27 to holders of record Dec. 17. The payment will bring to \$2 the total disbursements on the issue in the current year, compared with 90c. in 1936.

PERFORATED METAL

INDUSTRIAL and ORNAMENTAL

H & K industrial perforations embrace a range of sizes and shapes intended to meet the most exacting requirements of all industries.

H & K ornamental designs include standard and many beautiful and exclusive patterns suitable for architectural grilles, enclosures, ventilators, and all decorative uses.

Send us your specifications.

ANY METAL-ANY PERFORATION

The Harrington & King Co.

5657 FILLMORE ST., CHICAGO - 114 LIBERTY ST., NEW YORK



**Straight Cuts, Angle Cuts, Notching
Coping, Mitering . . .**

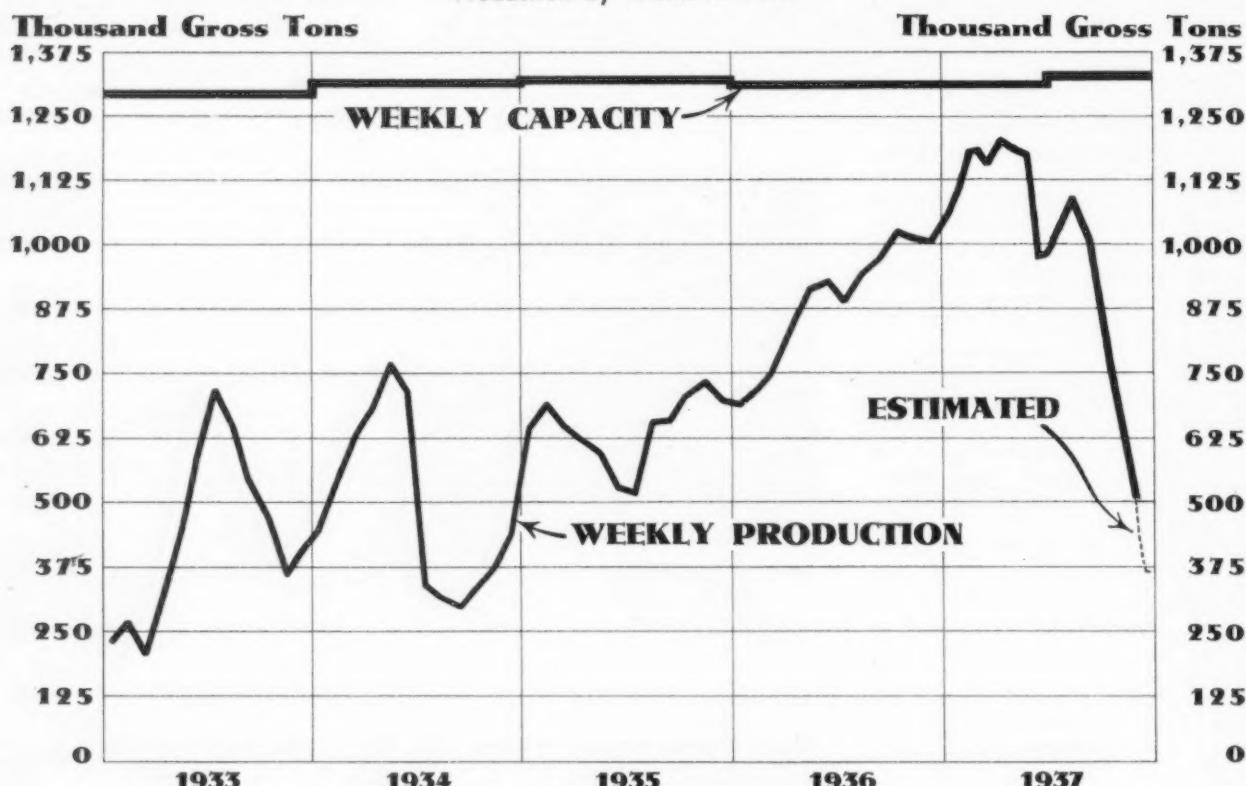
THE MARVEL No. 8 is the truly universal metal cutting saw, handling all work from $\frac{1}{8}$ " x $\frac{1}{8}$ " to 18" x 18". It is one of the most versatile multi-purpose saws built.

With its planer-type bed, hand and power feed, and swinging saw carriage that will feed the blade into the work at any angle from 45° right to 45° left, it gets in on every job to save labor and costly hours or to improve shop practice. It will save "warehouse cutting extras" on die plates. It will save hours of machining in roughing to form and shape. It will miter, notch, and cut off large work rapidly, or will nip off the smallest rod cleanly—will handle the heaviest job or the most delicate cut with equal efficiency. You will see them everywhere, and wherever you see one, it's the busiest machine in the shop.

ARMSTRONG-BLUM MFG. CO.
"The Hack Saw People"
5749 Bloomingdale Ave., Chicago, U.S.A.

PRODUCTION

Average Weekly Production of Open-Hearth and Bessemer Steel Ingots by Months, 1933-1937, and Estimated Production by Weeks in 1937



Figures for the Current Week Are Not Indicated on the Chart Until the Following Week

STEEL INGOT
PRODUCTION
BY DISTRICTS:
Per Cent
of Capacity

| | Current Week* | Last Week |
|--------------------|---------------|-----------|
| Pittsburgh | 17.0 | 24.0 |
| Chicago | 23.5 | 24.0 |
| Valleys | 21.0 | 27.0 |
| Philadelphia | 25.0 | 30.0 |
| Cleveland | 17.0 | 33.0 |
| Buffalo | 17.5 | 21.5 |
| Wheeling | 22.0 | 44.0 |
| Southern | 37.5 | 37.5 |
| Ohio River | 49.5 | 22.0 |
| Western | 55.0 | 55.0 |
| St. Louis | 12.5 | 13.0 |
| Detroit | 40.0 | 46.0 |
| Eastern | 20.0 | 40.0 |
| Aggregate | 23.5 | 27.5 |

* Allowance made for holiday.

Weekly Booking of Construction Steel

| | Week Ended | | | | Year to Date | |
|---|---------------|---------------|---------------|---------------|--------------|-----------|
| | Dec. 21, 1937 | Dec. 14, 1937 | Nov. 23, 1937 | Dec. 21, 1936 | 1937 | 1936 |
| Fabricated structural steel awards..... | 12,100 | 24,050 | 6,500 | 23,855 | 1,040,235 | 1,041,980 |
| Fabricated plate awards..... | 2,115 | 2,765 | 800 | 175 | 116,395 | 213,015 |
| Steel sheet piling awards..... | 0 | 100 | 0 | 2,355 | 64,165 | 56,325 |
| Reinforcing bar awards..... | 1,700 | 2,550 | 4,375 | 4,095 | 290,340 | 326,665 |
| Total Lettings of Construction Steel... | 15,915 | 29,465 | 11,675 | 30,480 | 1,511,135 | 1,637,985 |

... .SUMMARY OF THE WEEK. . . .

▼ ▼ ▼

... .***Spotty improvement noted in orders and inquiries.***

◦ ◦ ◦

... .***Sentiment in industry greatly improved as 1937 slips into discard.***

◦ ◦ ◦

... .***Steel scrap gains 50c. at Chicago; ingot operations 23½%.***

DESPITE a further recession in steel ingot production to 23½ per cent of the country's capacity, spotty improvement in orders and inquiries is becoming more apparent, possibly a forerunner of more widespread buying interest some time in January. Meanwhile, another reduction in operations may occur during the mid-holiday week as some mills, which now are trying to give as much employment as possible just before Christmas, will be shut down this Thursday or Friday until New Year's Day.

The recent moderate gain in steel scrap prices has not gone further at Pittsburgh and Philadelphia, but a rise of 50c. a ton has occurred at Chicago, bringing THE IRON AGE scrap composite price up to \$13.58, the third consecutive weekly advance and 66c. a ton above the year's low point in November.

Much of this week's more hopeful news comes out of Chicago, where one important producer has had the largest sales since the week of Sept. 24. Operations in that area are also helped out by an increase by one company, which almost offset losses by others, resulting in a net reduction of only a half point in the district average to 23½ per cent.

Sentiment throughout the industry is decidedly improved, not because of any marked change in the situation, but on the ground that the worst probably will be over with the passing of 1937 and that 1938 is bound to bring some improvement, though it may be of very moderate proportions in the early part of the year at least.

Tangible evidences of a turn for the better are found in the condition of consumers' stocks, which in many, though not all, instances are below normal size and will soon require replenishment.

IT is apparent that most of such early improvement as may come in 1938 will result from the rebuilding of depleted inventories of miscellaneous

consumers as the major outlets—building construction, the railroads and the automobile industry may not contribute a great deal of tonnage during the next month or so.

This, of course, is an off season for building contracts, except when, as was the case a year ago, there is a price incentive to rush them into the market. The Government's housing bill, whatever stimulus it may eventually afford, will be slow in getting into motion so far as steel requirements are concerned.

The railroads are cutting their orders so small that they are reluctant to accept even the small over-runs which are sometimes unavoidable in mill practice. However, it is probable that a favorable decision on higher freight rates will bring out a good deal of buying that is now being held back. For example, railroads centering at Chicago are expected to place between 150,000 and 200,000 tons of rails when the freight rate issue is settled. The Burlington, whose program for the building of 1250 cars in its own shops was announced in October, is now taking some of the steel. The St. Louis-Southwestern has received court permission to spend \$1,244,443 for cars, locomotives, rails and machinery; the Louisiana & Arkansas has ordered 275 flat cars; the United States Army will buy an indefinite number of tank cars, and a Brazilian railroad is inquiring in this country for 250 freight cars.

Long quiescent, the shipbuilding industry will enter upon a new era of activity next year with the awarding of 12 cargo ships by the Maritime Commission, on which bids have been requested by Feb. 1. These ships will take 55,300 tons of steel. Standard Oil tank ships, which may require as much as 20,000 tons of steel, may be awarded in January.

Structural steel lettings in the week were only 12,000 tons, of which 2560 tons is for the Bronx-Whitestone bridge, New York, and 2500 tons for altering the Detroit Baseball Club stadium. New projects out for bids include 2700 tons for a hospital in Pittsburgh, 2700 tons for a city hall in Houston, Tex., and 1200 tons for a power house at Lansing, Mich. About 10,000 tons of sheet piling will be required for the Delaware aqueduct, New York.

ON the labor front, the action of the convention of the Steel Workers Organizing Committee in authorizing the union leaders to negotiate new wage contracts "without instructions" may be significant of a more conciliatory attitude on wages and other conditions. Negotiations for renewal of existing contracts are to be begun Feb. 7.



... Ingot operations drop further owing to year-end influences.

• • •

... Finished steel specifications gain slightly with some companies.

• • •

... Consumers' stocks low; may mean better buying in January.

PITTSBURGH, Dec. 21.—Because of Christmas holiday shutdowns, steel output in the Pittsburgh district this week is estimated at 17 per cent of capacity, a drop of seven points from last week's level. The Wheeling-Weirton district is off 22 points to 22 per cent of capacity. Steel ingot output over the next few weeks will continue to reflect year-end influences. Some mills are using up supplies of raw steel before adding to steel-making operations.

Finished steel specifications during the past week have held up surprisingly well in view of the usual seasonal influences. Bookings so far this month at some plants are ahead of the corresponding November period or at least on a par. Some companies, however, are not doing this well and the aggregate picture will be somewhat affected during the remainder of the year.

The attempt to reduce inventories to a minimum by consumers continues. The existence of sub-normal supplies at some manufacturing plants is being taken by some producers as an indication toward better buying some time in January. No sharp increase in demand, however, is expected but a gradual improvement is anticipated.

Pig Iron

New business continues dull and not much change in the present picture is expected before the end of the year. Many manufacturing plants are sharply curtailing operations owing to seasonal influences and the current business outlook. Releases on commitments

are slow in materializing and in many cases will be carried into the next quarter.

Semi-Finished Steel

Total specifications so far this month are below those of the corresponding November period. Fresh orders are light. Export inquiry is slightly better, but foreign buyers are slow in closing.

Bars

Hot rolled bar sales during the past week have declined from those of the previous period. Current business is entirely composed of fill-in requirements and tonnages placed are exceptionally small. Some shipments have been deferred until after the first of the year. Not much change is expected in the bar market during the next few weeks owing to year-end influences.

Cold Finished Bars

Demand for cold finished bars is at low ebb and bookings are about on a par with tonnages placed during the past few weeks. Total specifications received so far this month are below those of the corresponding November period. Material scheduled for shipment to automotive manufacturers in some cases has been held up until after the first of the year.

Tubular Goods

Total business so far this month is not up to the volume placed during the corresponding November period. Pipe specifications are holding up relatively better than those for other products. Most orders, however, are for absolute

requirements as consumers are endeavoring to reduce inventories to a minimum.

Tin Plate

Current business continues dull. Specifications for advance rolling are not large. This condition is due to the fact that consumers have good stocks. Operations this week are off somewhat owing to holiday shutdowns.

Sheets

Miscellaneous demand is highly irregular and spotty with practically all consumers' expending every effort to reduce inventories. Total sheet business during the past week is about even with that of the previous period but orders so far this month are running below corresponding November specifications. In some cases shipments to automotive plants have been suspended until after the first of the year.

Wire

Orders for both manufacturers' and merchant wire products have eased off during the past week. Some manufacturing concerns curtailed operations and jobbers are only buying as actually needed. Numerous cases of jobbers' stocks being exceptionally low continue to appear.

Strip

Strip steel sales are no better than a week ago and, if anything, have declined slightly. Production is at a low point and many mills continue to find it necessary to shut down in order to accumulate enough orders to make a satisfactory schedule. Buying from automotive parts makers is practically non-existent and support from this source is not expected until after the first of the year. Miscellaneous purchasers are restricting their specifications to small fill-in requirements.

Plates & Shapes

Structural plate and shape specifications have shown a slight improvement during the past week. Both inquiries and awards compare favorably with recent activity. The rate at which new inquiries are being received by mills is surprising in view of the drop in demand for other steel products. A State hospital in Pittsburgh will take 2700 tons of material.

Reinforcing Bars

Mill specifications show little change from a week ago. The

A Comparison of Prices

Market Prices at Date, and One Week, One Month, and One Year Previous
Advances Over Past Week in Heavy Type, Declines in Italics

Rails and Semi-finished Steel

| | Dec. 21, 1937 | Dec. 14, 1937 | Nov. 23, 1937 | Dec. 21, 1936 |
|-------------------------------|---------------|---------------|---------------|---------------|
| Per Gross Ton: | | | | |
| Rails, heavy, at mill | \$42.50 | \$42.50 | \$42.50 | \$39.00 |
| Light rails, Pittsburgh | 43.00 | 43.00 | 43.00 | 35.00 |
| Rerolling billets, Pittsburgh | 37.00 | 37.00 | 37.00 | 32.00 |
| Sheet bars, Pittsburgh | 37.00 | 37.00 | 37.00 | 32.00 |
| Slabs, Pittsburgh | 37.00 | 37.00 | 37.00 | 32.00 |
| Forging billets, Pittsburgh | 43.00 | 43.00 | 43.00 | 39.00 |
| Wire rods, Nos. 4 and 5, P'gh | 47.00 | 47.00 | 47.00 | 43.00 |
| Skelp, grvd. steel, P'gh, lb. | 2.10 | 2.10 | 2.10 | 1.80 |

Finished Steel

| Per Lb.: | Cents | Cents | Cents | Cents |
|--|--------|--------|--------|-------------------|
| Bars, Pittsburgh | 2.45 | 2.45 | 2.45 | 2.05 |
| Bars, Chicago | 2.50 | 2.50 | 2.50 | 2.10 |
| Bars, Cleveland | 2.50 | 2.50 | 2.50 | 2.10 |
| Bars, New York | 2.79 | 2.79 | 2.79 | 2.40 |
| Plates, Pittsburgh | 2.25 | 2.25 | 2.25 | 1.90 |
| Plates, Chicago | 2.30 | 2.30 | 2.30 | 1.95 |
| Plates, New York | 2.54 | 2.54 | 2.54 | 2.19 |
| Structural shapes, Pittsburgh | 2.25 | 2.25 | 2.25 | 1.90 |
| Structural shapes, Chicago | 2.30 | 2.30 | 2.30 | 1.95 |
| Structural shapes, New York | 2.5125 | 2.5125 | 2.5125 | 2.16 ¹ |
| Cold-finished bars, Pittsburgh | 2.90 | 2.90 | 2.90 | 2.35 |
| Hot-rolled strips, Pittsburgh | 2.40 | 2.40 | 2.40 | 2.15 |
| Cold-rolled strips, Pittsburgh | 3.20 | 3.20 | 3.20 | 2.85 |
| Hot-rolled annealed sheets, No. 24, Pittsburgh | 3.15 | 3.15 | 3.15 | 2.80 |
| Hot-rolled annealed sheets, No. 24, Gary | 3.25 | 3.25 | 3.25 | 2.90 |
| Sheets, galv., No. 24, P'gh. | 3.80 | 3.80 | 3.80 | 3.40 |
| Sheets, galv., No. 24, Gary | 3.90 | 3.90 | 3.90 | 3.50 |
| Hot-rolled sheets, No. 10, Pittsburgh | 2.40 | 2.40 | 2.40 | 2.15 |
| Hot-rolled sheets, No. 10, Gary | 2.50 | 2.50 | 2.50 | 2.25 |
| Cold-rolled sheets, No. 20, Pittsburgh | 3.55 | 3.55 | 3.55 | 3.25 |
| Cold-rolled sheets, No. 20, Gary | 3.65 | 3.65 | 3.65 | 3.35 |
| Wire nails, Pittsburgh | 2.75 | 2.75 | 2.75 | 2.25 |
| Wire nails, Chicago dist. mill | 2.80 | 2.80 | 2.80 | 2.30 |
| Plain wire, Pittsburgh | 2.90 | 2.90 | 2.90 | 2.60 |
| Plain wire, Chicago dist. mill | 2.95 | 2.95 | 2.95 | 2.65 |
| Barbed wire, galv., P'gh. | 3.40 | 3.40 | 3.40 | 2.70 |
| Barbed wire, galv., Chicago dist. mill | 3.45 | 3.45 | 3.45 | 2.75 |
| Tin plate, 100-lb. box, P'gh. | \$5.35 | \$5.35 | \$5.35 | \$5.25 |

On export business there are frequent variations from the above prices. Also in domestic business, there is at times a range of prices on various products, as shown in our detailed price tables.

The Iron Age Composite Prices

Finished Steel

| | |
|---------------|---------------|
| Dec. 21, 1937 | 2.605c. a Lb. |
| One week ago | 2.605c. |
| One month ago | 2.605c. |
| One year ago | 2.274c. |

Based on steel bars, beams, tank plates, wire, rails, black pipe, sheets and hot-rolled strip. These products represent 85 per cent of the United States output.

HIGH

LOW

| | | |
|-----------|------------------------------------|-----------------------------------|
| 1937..... | 2.605c., Mar. 9; 2.330c., Mar. 2 | \$23.25, Mar. 9; \$20.25, Feb. 16 |
| 1936..... | 2.330c., Dec. 28; 2.084c., Mar. 10 | 19.72, Nov. 24; 18.73, Aug. 11 |
| 1935..... | 2.130c., Oct. 1; 2.124c., Jan. 8 | 18.84, Nov. 5; 17.83, May 14 |
| 1934..... | 2.199c., Apr. 24; 2.008c., Jan. 2 | 17.90, May 1; 16.90, Jan. 27 |
| 1933..... | 2.015c., Oct. 3; 1.867c., Apr. 18 | 16.90, Dec. 5; 13.56, Jan. 3 |
| 1932..... | 1.977c., Oct. 4; 1.926c., Feb. 2 | 14.81, Jan. 5; 13.56, Dec. 6 |
| 1931..... | 2.037c., Jan. 13; 1.945c., Dec. 29 | 15.90, Jan. 6; 14.79, Dec. 15 |
| 1930..... | 2.273c., Jan. 7; 2.018c., Dec. 9 | 18.21, Jan. 7; 15.90, Dec. 16 |
| 1929..... | 2.317c., Apr. 2; 2.273c., Oct. 29 | 18.71, May 14; 18.21, Dec. 17 |
| 1928..... | 2.286c., Dec. 11; 2.217c., July 17 | 18.59, Nov. 27; 17.04, July 24 |
| 1927..... | 2.402c., Jan. 4; 2.212c., Nov. 1 | 19.71, Jan. 4; 17.54, Nov. 1 |

Pig Iron

| |
|---------------------|
| \$23.25 a Gross Ton |
| 23.25 |
| 23.25 |
| 19.73 |

Based on average of basic iron at Valley furnace and foundry irons at Chicago, Philadelphia, Buffalo, Valley and Southern iron at Cincinnati.

HIGH

LOW

| | | |
|-----------|-----------------------------------|------------------------------------|
| 1937..... | \$23.25, Mar. 9; \$20.25, Feb. 16 | \$21.92, Mar. 30; \$12.92, Nov. 16 |
| 1936..... | 19.72, Nov. 24; 18.73, Aug. 11 | 17.75, Dec. 21; 12.67, June 9 |
| 1935..... | 18.84, Nov. 5; 17.83, May 14 | 13.42, Dec. 10; 10.33, April 23 |
| 1934..... | 17.90, May 1; 16.90, Jan. 27 | 13.00, Mar. 13; 9.50, Sept. 25 |
| 1933..... | 16.90, Dec. 5; 13.56, Jan. 3 | 12.25, Aug. 8; 6.75, Jan. 3 |
| 1932..... | 14.81, Jan. 5; 13.56, Dec. 6 | 8.50, Jan. 12; 6.43, July 5 |
| 1931..... | 15.90, Jan. 6; 14.79, Dec. 15 | 11.33, Jan. 6; 8.50, Dec. 29 |
| 1930..... | 18.21, Jan. 7; 15.90, Dec. 16 | 15.00, Feb. 18; 11.25, Dec. 9 |
| 1929..... | 18.71, May 14; 18.21, Dec. 17 | 17.58, Jan. 29; 14.08, Dec. 3 |
| 1928..... | 18.59, Nov. 27; 17.04, July 24 | 16.50, Dec. 31; 13.08, July 2 |
| 1927..... | 19.71, Jan. 4; 17.54, Nov. 1 | 15.25, Jan. 11; 13.08, Nov. 22 |

Steel Scrap

| |
|---------------------|
| \$13.58 a Gross Ton |
| 13.42 |
| 12.92 |
| 17.75 |

Based on No. 1 heavy melting steel quotations at Pittsburgh, Philadelphia and Chicago.

number of projects coming out are not as numerous as several weeks ago but several large-sized jobs are still pending. Two flood control projects in western Pennsylvania will each take about 1300 tons of reinforcing bars. The general contract on one of them, Crooked Creek Dam near Ford City, Pa., will be let soon. George M. Brewster Co., Bogota, N. J., is low bidder.



Baltimore plans pipe lines for water system in Twenty-fifth Street, Caton Avenue and other thoroughfares; also lines for storm sewer system. Fund of \$30,000 has been secured through Federal aid.

St. Charles, Mich., plans pipe lines for water system and other waterworks installation. Cost about \$40,000. Francis Engineering Co., Saginaw, Mich., is consulting engineer.

Webster, N. Y., plans pipe lines for water system in Forest Lawn district. Cost over \$50,000. Financing will be arranged through Federal aid.

Holdenville, Okla., plans pipe lines for extensions in water system and other waterworks installation. Cost about \$70,000. A bond issue in that amount is being arranged.

Broadmoor Hotel, Inc., Colorado Springs, Colo., Spencer Penrose, president, plans about five miles through mountain district to Will Rogers Shrine of Sun on Cheyenne Mountain, for water supply at latter point. Work is scheduled to begin early next year. Milton J. Strong, first noted address, is construction superintendent in charge.

Ephrata, Wash., plans pipe lines for water system; also sewage system and sewage disposal works. Parker & Hill, Smith Tower Building, Seattle, are consulting engineers.

Monroe, Wash., plans pipe lines for water system and other waterworks installation. Cost about \$35,000. Bond issue will be arranged in that amount, with special election to be held soon. Parker & Hill, Smith Tower Building, Seattle, are consulting engineers.

Prentiss, Miss., will ask bids soon for about 8000 ft. of various sizes for water system. J. C. Sanford, Marshall, Miss., is engineer.

Olympic View Water District, Olympic View, Wash., plans pipe lines for water system and other waterworks installation. Cost about \$40,000. C. H. Glover, Court House, Everett, Wash., is engineer.

Aurora Country Club, Aurora, Ill., plans pipe lines for underground water system. Cost about \$25,000. It is proposed to begin work next spring.

Red Oak, Iowa, plans 11,500 ft. of 2 to 10-in. for water system, replacing present mains. Financing is being arranged through Federal aid. Arthur E. J. Johnson is city clerk in charge.

Rye, Colo., plans about 11,000 ft. of various sizes for water system. Cost about \$25,000. Financing is being arranged in part through Federal aid.

Colchester, Conn., plans pipe lines for water system; also storage tank, pumping machinery and other waterworks equipment. Cost about \$100,000, of which \$40,000 will be secured through Federal grant. H. W. Buck, 650 Main Street, Hartford, Conn., is consulting engineer.

Elgin, Ore., asks bids Dec. 29 for waterworks improvements, comprising extension of present supply line, concrete and earth-rock fill intake dam, grit chamber, pipe line to storage reservoir, and 150,000-gal. reinforced concrete reservoir. Cost about \$16,320.

Preston, Idaho, has called for bids for waterworks system to cost \$110,000. R. G. Harding, Salt Lake City, Utah, is consulting engineer.

Seattle, Wash., will open bids Dec. 27 for 42,808 ft. of water pipe; alternate bids on electrically welded steel pipe, high-strength cast iron pipe, centrifugal cast iron pipe, and sand cast iron pipe.

La Mesa, Lemon Grove, and Spring Valley Irrigation District, La Mesa, Cal., has awarded, subject to PWA approval, 939 tons of 4, 6, 8, and 12-in. pipe to United States Pipe & Foundry Co., San Francisco.

Seattle, Wash., has awarded 1150 tons of centrifugal cast iron pipe to be used in Ninth Avenue mains to United States Pipe & Foundry Co., San Francisco.

Vancouver, Wash., has awarded 400 tons of 6 to 16-in. pipe to United States Pipe & Foundry Co., San Francisco.

Long Beach, Cal., will call for bids Jan. 4 on 5672 ft. of 6-in. and 513 ft. of 8-in. pipe.

Spokane, Wash., has opened bids on 1800 ft. of 12-in. and 6000 ft. of 6-in. pipe.



... Missouri Pacific buys 900 tons of rails.

ST. LOUIS, Dec. 21.—The Missouri Pacific Railway has bought 900 tons of 131-lb. rails from the Carnegie-Illinois Steel Corp. for emergency laying on a four-mile stretch in Arkansas.

St. Louis Southwestern Railway has been authorized by the Federal Court to expend \$1,244,443 for improvements during 1938. Road improvements include: relaying tracks with heavier rails, \$3,542; tie plates and rail anchors, \$68,845; shops and engine houses, \$119,023; roadway machines, \$15,967; signals and interlocking equipment, \$18,072; shop machinery, \$93,132; power plant machinery, \$15,485; locomotives, \$40,336; freight cars, \$295,100; passenger cars, \$130,000, and work cars, \$8,778.

Walsh & Wells, St. Louis; Nolen Construction Co., Detroit, and Schevenell Construction Co., Mem-

phis, are low bidders on each of three sections of a sewer project at Memphis, requiring 1000 tons of reinforcing bars.

Buying of finished steel continues at a low rate, and mills expect no buying of consequence until after the turn of the year.

There was no buying of pig iron—either for spot or future delivery—during the past week, and there are no inquiries pending. With steel mills closing down until after Jan. 1, the melt is at the lowest point of the year. Stove foundries, too, are down, and besides find themselves with large stocks of finished product.

Machinery Men Hit Anti-Saving Policy

BUSINESS buying must be encouraged if payrolls and consumer purchasing power is to increase, William J. Kelly, president of Machinery Institute, said last week at Chicago with release of the institute's report on "Savings and American Progress."

"National policies which discourage the accumulation of capital for launching new industries and improving and expanding old ones are largely responsible for the halting pace in the revival of consumer purchasing power," Mr. Kelly said.

The institute concluded that the undistributed profits tax and phases of the administration of the Securities Exchange Act have discouraged investment in capital equipment, that American industry has no great excessive capacity, and that the Government anti-saving policies are curbing activities in the durable goods industries—iron and steel, machinery and equipment manufacture and building construction—on which American progress depends.

A.S.T.M. Issues New Refractory Manual

THE American Society for Testing Materials has published a new edition of its refractory manual which, in addition to containing all refractory standards and detailed methods for interpreting test data, includes for the first time a section devoted to the recommended procedure for calculating heat losses through furnace walls. Copies of the manual may be secured from the society's office at 260 South Broad Street, Philadelphia, at a cost of \$1.25 per copy.